Status of the

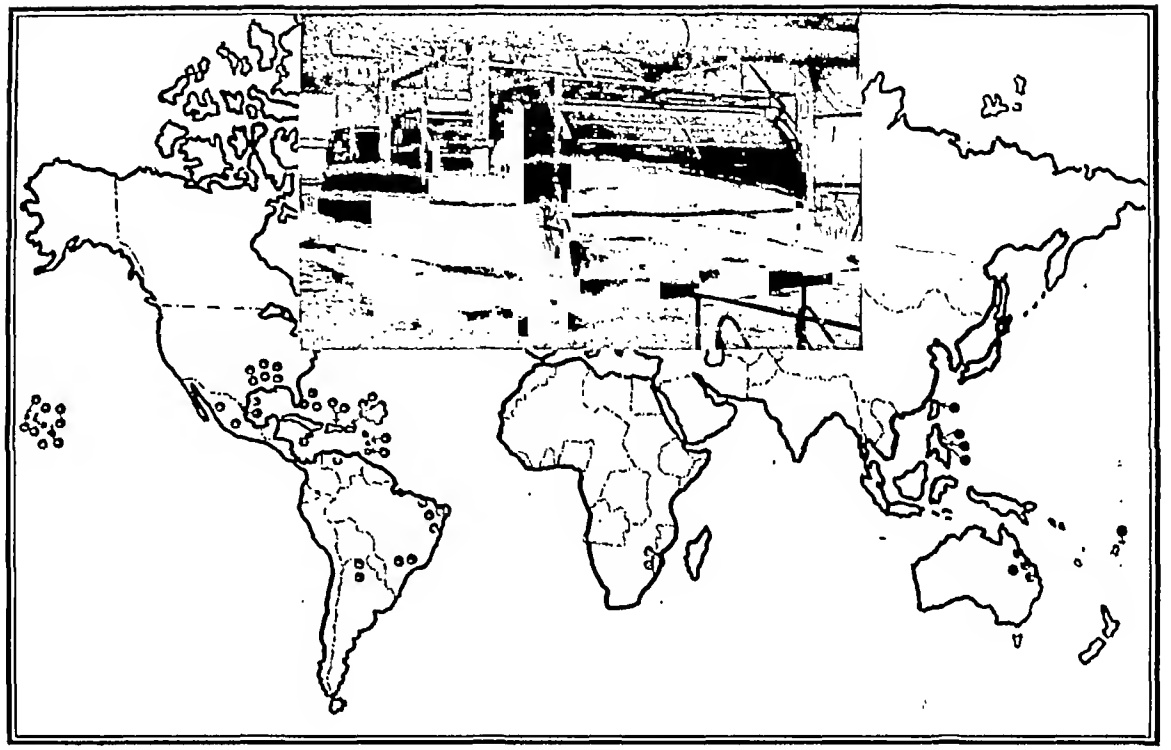
OLIVER-CAMPBELL CACHAZA FILTER

as of August 1, 1938

128 units installed or under construction for

88 different factories in

17 different countries



Every user handles Cane Mud Settlings with these Advantages:

1. Lower Sucrose loss in filter cake.
2. Less inversion of sucrose and less re-adsorption of impurities due to shorter filter cycles.
3. Less wash water to be evaporated.
4. Higher purity of filtrate.
5. Cleaner filter station.
6. Reduction in undetermined loss of sucrose due to elimination of leaks, drippage and spillage, common with filter presses.
7. Complete elimination of cotton filter press cloths, cloth washing machine and repairing filter cloths.
8. Large savings in labor due to the fact that one man can handle the Oliver-Campbell Filter installation.
9. Continuous instead of intermittent operation.
10. Easier supervision of filter station.
11. More accurate accounting of sucrose losses, due to uniformity of Oliver cake. Oliver cake does not have disagreeable odor associated with press cake and handles more easily, as well as being in a better condition to spread over the fields if used as a fertilizer.

Catalogue 207, recently issued, gives full details. In sending for copies, specify whether you wish either or both English and Spanish editions.

OLIVER UNITED FILTERS INC.

NEW YORK
CHICAGO
SAN FRANCISCO

Factories: Oakland, Calif., and Hazleton, Pa.
Cable Address: "Oliunifilt"
Manufacturing facilities in Australia, Canada, Japan and *European Countries*

Argentina
E. C. Knight E. Hijo, Buenos Aires

Cuba
William A. Powe, Havana

Philippine Islands
The Edward J. Nell Co., Manila

Australia
Crossle & Duff Pty. Ltd., Melbourne

Japan
Sanki Engineering Co., Ltd., Tokyo

Brazil
Ayres & Son, Pernambuco

Java
Van Lelyveld & Co., Soerabaia

South Africa
Edward L. Bateman, Pty. Ltd., Johannesburg

England
Dorr-Oliver Co., Ltd., London

France
Soc. Dorr-Oliver, Paris

Holland
Dorr-Oliver N. V., The Hague

Germany
Dorr-Gesellschaft mbH, Berlin

Hawaii
A. R. Duvall,
P. O. Box 33, Honolulu

SUGAR REFERENCE BOOK *and* DIRECTORY

1938

Seventh Annual Edition

Price $5.25 or
21 Shillings the Copy

RUSSELL PALMER, *Publisher*

95 RIVER STREET, HOBOKEN, NEW JERSEY, U. S. A.

NEW YORK: 56 WEST 45th STREET LONDON: 3 SAVOY PLACE, W. C. 2

PETREE & DORR ENGINEERS, INC.,

Agents for

SCHUTTE & KOERTING'S BAROMETRIC MULTI-JET SPRAY CONDENSER *In Cuba, Puerto Rico, South America, Hawaii, the Philippine Islands, Japan, India.*

Producing high vacuum without vacuum (air) pumps, utilizing water sprays for condensing the vapor and converging water jets for removing the air and non-condensable gases.

LAFEUILLE ROTARY TUBULAR CRYSTALLIZER PAN *In U. S. A. Including Puerto Rico and Hawaii, Canada, Cuba, The Dominican Republic, Brazil, India.*

Vacuum pans that boil, cool and reheat the massecuite in one unit and one cycle, with a marked improvement in recovery and quality, and a phenomenal saving in fuel, time and equipment.

SUCRO-BLANC, THE MODERN LOW COST SUGAR REFINING PROCESS *In Louisiana, Argentina, Brazil, Hawaii, India.*

A refining process employing chemical reactions—low in installation cost—simple, clean and economical—producing refined sugars of the highest quality.

DICALITE HIGH EFFICIENCY DIATOMACEOUS FILTERAIDS *In Cuba, Puerto Rico, The Dominican Republic, Haiti and the other West Indian Islands, Central and South America (Except Peru), Egypt, India.*

Filteraids that give higher flowrates with equal clarity, assuring the same or greater clarity with less material and at lower cost per ton of filtered sugar.

120 Wall Street, New York

THE DORR CLARIFIER,
Patented

Standard clarification equipment for modern cane sugar factories. Takes up little room; replaces all defecators and mud tanks. Delivers a continuous stream of clear, brilliant juice; economizes on fuel and labor; discharges a denser mud which greatly facilitates filtration and reduces the required filtering area by about 25%.

Sugars made from juices treated in Dorrs are cleaner and keep better.

P-D COMPOUND CLARIFICATION,
Patented

Compound Clarification is the major solution to the proper clarification of refractory juices from P. O. J. canes and other new varieties.

It increases the recovery of sugar by 1 to 2%; produces a denser mud, which reduces the load on the filters or filter presses; doubles the colloid elimination, resulting in clean sugars of high filtrability and in a better exhaustion of the final molasses.

Export Agents for

EDGE MOOR BOILERS AND BOILER ACCESSORIES:

Complete steam generating plants including: superheaters; water walls; air preheaters; economizers. The boiler designs include 4 drum and 3 drum bent tube type; straight tube, cross tube and long drum types.

FULTON IRON WORKS CO.

ST. LOUIS, MO., U. S. A.

REPRESENTATIVES

ARGENTINA	BUENOS AIRES: General Electric S. A. Avenida Roque Saenz Pena 636	HAWAII	HONOLULU: W. A. Ramsay, Ltd. 74 Queen St.
BRAZIL	RIO DE JANEIRO: International Machy. Co. Rua. Sao Pedro, 66	LOUISIANA	NEW ORLEANS: Will J. Gibbons, Jr. 727 Whitney Bldg.
	PERNAMBUCO: International Machy. Co. Avenida Rio Branco 193	MEXICO	MEXICO, D. F.: Abel G. Rios Florencia #70
CUBA	HAVANA: Woodward-McMillan & Cia. Edificio Metropolitana 739-41	PHILIPPINE ISL.	MANILA: Pacific Comm. Co.
		PUERTO RICO	SAN JUAN: F. A. Ortiz 6½ Tetuan St.

FULTON
KINGBOLTLESS MILLS

They are readily adapted to Existing Bed Plates and Drives.

They make possible the Longer Use of Roll Shells by permitting them to be Turned to relatively Smaller Diameters than is possible with any other type of Housing.

When used to Replace Old Inefficient Mills, they have all the Advantages and Features of the latest Design, and utilize many of the old parts.

FULTON IMPROVED GEARING

FULTON Improved Type of Gearing is adaptable to Existing Mills. It is an economical means of converting old High Stand Gearing into Low Type for Efficient and More Quiet Operation at High Speeds, greatly Reducing Vibration and consequent Wear.

FULTON ENGINEERING SERVICE

Will solve the problem of Rebuilding your Tandem with Modern Equipment, through Gradual Expenditure, by Replacing Wornout Crushers, Mills or Gearing, One Unit at a Time.

DESIGNERS - ENGINEERS - CONSTRUCTORS

COMPLETE SUGAR FACTORIES

SUCRO-BLANC, Inc.

79 WALL STREET NEW YORK CITY

REPRESENTATIVES OF SUCRO-BLANC, INC.:—

In Louisiana, Argentina, Brazil, Hawaii and India:
PETREE and DORR ENGINEERS, Inc.
120 Wall Street, New York City

In Cuba:
MIGUEL de ARANGO
Bank of Canada Bldg., Havana

In Venezuela & Central America:
KRAJEWSKI-PESANT MFG. Co.
227 Fulton St., New York City

In China, Japan and the Philippines:
THE EARNSHAWS DOCKS & HONOLULU IRON WORKS
Manila, P. I.

★ ★ ★ ★ ★

THROUGHOUT

THE SUGAR WORLD

USERS ARE FINDING

SUCRO-BLANC

THE MODERN REFINING PROCESS

THE EFFECTIVE AND

LOW COST WAY OF REFINING

★ ★ ★ ★ ★

FULL DATA WILL GLADLY BE FURNISHED ON REQUEST

Books on sugar

Sugar Manufacture and Agriculture

A B C OF AGROBIOLOGY
By Dr. O. W. Willcox, Consulting Agrobiologist. The quantitative science of plant life and plant nutrition for farmers and gardeners; deals with the fundamentals of soil fertility and crop yields. 323 pages..... .....$2.75

CALIFORNIA & HAWAIIAN SUGAR REFINING CORPORATION
By Boris Emmet, Ph.D. An analytical study of an industrial organization from the production of the raw material to the delivery of the ultimate product. $2.50

CANE SUGAR
By Noel Deerr. 2nd edition, revised and enlarged, 650 pp., 360 illustrations, 30 plates. A broad and comprehensive treatise on cane sugar and its manufacture, by a well-known authority.....$15.00

CANE SUGAR AND ITS MANUFACTURE
By H. C. Prinsen Geerligs. 343 pp. A valuable treatise by the distinguished former director of the Java Sugar Experiment Station.....$6.00

CULTIVATION OF CANE SUGAR IN JAVA
By R. A. Quintus. 164 pp. Describes plantation methods..... .....$5.00

DETERIORATION OF RAW SUGARS IN STORAGE
By Wm. L. Owen. 50 pp. Discusses causes and remedies.
Cardboard Cover.....$2.00
Paper Cover.....$1.00

ECONOMIC ASPECTS OF CANE SUGAR PRODUCTION
By Francis Maxwell. A book on the economic aspects of the industry in various countries ..$5.00

FABRICACION DE AZUCAR BLANCO DE HACIENDA
Por W. H. T. Harloff y H. Schmidt. 138 pág. Subraya sus aspectos practicos $3.00

HANDBOOK FOR CANE SUGAR MANUFACTURERS AND THEIR CHEMISTS
By the late Dr. Guilford L. Spencer, revised by George P. Meade, B.S., Ch.E. Seventh Edition. 560 pages. Outlines cane sugar manufacture from cutting the cane to shipping the sugar, and gives methods of sugar analysis..... .....$6.00

MACHINERY & EQUIPMENT OF THE CANE SUGAR FACTORY
By L. A. Tromp, pub. 1936, 632 pp. 616 drawings and 133 illustrations. An adequate text book covering all the machinery and equipment used in a cane sugar factory $9.00

MANUAL DE FABRICANTES DE AZUCAR DE CANA Y QUIMICOS AZUCAREROS
Por G. L. Spencer y Geo. P. Meade; septima edicion revisida y aumentada, traducida (1932) al Espanol por C. J. Bourbakis; 624 paginas .....$3.00 oro.

MANUFACTURE OF BEET SUGAR
By Franz Murke. 175 pp. In this book the main principles of the beet sugar industry are treated with brevity and conciseness for the use of sugar house executives.....$2.50

MANUFACTURE OF CANE SUGAR
By Llewellyn Jones and F. I. Scard. 2nd revised edition, 500 pp., illustrated. A thorough exposition of processes, including working by-products.$10.00

MANUFACTURE OF SUGAR FROM CANE AND BEET
By T. H. P. Heriot. 426 pp. A practical treatise. $9.50

MODERN MILLING OF SUGAR CANE
By Francis Maxwell. An authoritative, up-to-date account of the machinery and methods employed in milling cane in the principal sugar countries of the world, from the cane unloaders to the diffusion process; 423 pages with 250 illustrations and drawings.. .....$12.50

PLANTATION WHITE SUGAR MANUFACTURE
By W. H. T. Harloff and H. Schmidt. 138 pp. Emphasizes practical aspects.....$3.00

PRINCIPLES OF AGROBIOLOGY or THE LAWS OF PLANT GROWTH IN RELATION TO CROP PRODUCTION
By Dr. O. W. Willcox. Refers especially to the sugar beet and the sugar cane; 96 pages, double column, with 54 illustrations and graphs.....$4.00

SOILS OF CUBA
By H. H. Bennett and R. V. Allison. 422 pp., illustrated. With large soil map of Cuba and the Isle of Pines, 25 x 60, in colors, and key to the soils, in separate carton. Defines all the important soils of the Republic of Cuba and shows their general distribution. Special emphasis is devoted to the relationship of the different types to the production of sugar cane $6.25

SUGAR
By Geoffrey Fairrie. A practical work on the production and refining of raw cane and beet sugar, written in non-technical language. It is essentially a book for the busy executive and others who desire accurate information on sugar processes. Profusely illustrated, including cross-sectional views of entire sugar plants, showing the processes both complete and in detail. 481 pages.....$4.00

SUGAR
A Handbook for Planters and Refiners, by J. A. R. and B. E. R. Newlands. A comprehensive treatise on the production of sugar from cane, beet, and other plants. $12.00

SUGAR
By John E. Dalton. A case study of Government Control published 1937. 311 pages.....$3.00

SUGAR CANE AND ITS CULTURE
By Prof. F. S. Earle. A well printed and illustrated volume of 355 pages, embodying the results of more than twenty years' observation and experience in Cuba and Puerto Rico by one of the best known authorities on the sugar cane.....$4.50

SUGAR COST ACCOUNTS
By G. S. Skinner. A description (with model forms) of the system of plantation and factory cost records adopted by the Ste. Madeleine Sugar Co., Trinidad.....60 cents

SUGAR TECHNOLOGISTS' NOMON.
A graphic alignment chart for finding purities of sugar solutions from Brix and polarization, rapidly, accurately, and without figuring. Devised by A. F. Blake of Atlantic Sugar Refineries, Inc.....$2.00

SULPHITATION IN WHITE SUGAR MANUFACTURE
By Francis Maxwell. 84 pp., illustrated. Deals authoritatively with the use of sulphur in cane sugar manufacture, with review of processes adopted in leading white sugar countries.....$4.00

TRATADO DE LA FABRICACION DEL AZUCAR DE CANA
Por el Dr. H. C. Prinsen Geerligs traducido al castellano y ampliado por Nicolas Van Gorkum. $10.00 oro.

TROPICAL CROPS
By O. W. Barrett. An interesting work by the well known Puerto Rican scientist, describing all the major crops grown commercially in the tropics.....$4.00

Sugar Chemistry

CHEMICAL CONTROL FOR CANE SUGAR FACTORIES BY ASSOCIATION OF HAWAIIAN SUGAR TECHNOLOGISTS
Revised 1931—140 pp.—leather bound.....$3.00

CHEMICAL CONTROL IN CANE SUGAR FACTORIES
By H. C. Prinsen Geerligs. Revised and enlarged edition, illustrated, 140 pp. Presents the most modern methods of analyzing the various products. $5.00

DETERMINATION OF HYDROGEN-IONS
By W. Mansfield Clarke, Third Edition. 717 pp. Entirely revised. Much new material. Many new graphs. Improved color chart of indicators. Hydrogen-ion concentration is a dominant factor in sugar manufacture. This book contains the most thorough exposition of principles, methods and indicators.....$6.50

ENGINEERING CHEMISTRY
By Thomas B. Stillman. Sixth edition. 760 pp. A manual of quantitative chemical analysis for the use of students, chemists and engineers.....$12.50

Facts About Sugar, *Book Department* *95 River Street Hoboken, N. J.*

AMERICAN TOOL & MACHINE COMPANY

Incorporated

CENTRIFUGALS

1423 Hyde Park Avenue, Boston, Mass., U. S. A.
New York Office: 30 Church St.

Established 1843

"A T & M Advances Centrifugal Design"

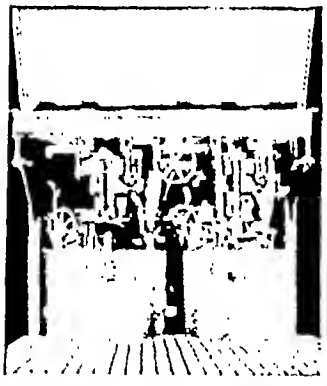
PRODUCTS:

WESTON TYPE SUGAR CENTRIFUGALS, 30 inch, 36 inch, 40 inch, 48 inch and larger—belt, motor or water drive. Used in centrals and refineries on molasses sugars, grade sugars, finishing raw or refined cane or beet sugars. Baskets furnished flat bottom or self-discharging in any machinable metal and all coatings. Over 8,000 A T & M centrifugals are successfully operating in centrals and refineries throughout the world.

LABORATORY CENTRIFUGALS, 5 inch to 18 inches—hand, belt or motor drive. Baskets in any machinable metal and all coatings.

- Automatic and Measuring Boxes for Char Control
- Bag Sheathing Machines
- Conveyors
  - Automatic Char
  - Mingling
  - Ribbon Scroll
- Crushers for Raw Sugar
- Dischargers
- Elevators
- Extensions
- Linings
  - Backing
  - Lock
  - Perforated
- Minglers, Hot and Cold
- Mixers
- Nozzles
- Pinwheels for breaking up lumps in soft sugar—distribute sugar to any bin
- Remelters
- Spouts
- Syrup Pipes
- Tipping Pans for Double Gutters

WESTON TYPE SUGAR CENTRIFUGALS



Steel safety curbs standard. Framing of steel or cast iron. Machines can be supplied with positive control—push button start and stop, regenerative braking, mechanical unloaders, dischargers, automatic sprayers. Baskets flat bottom or self-discharging in any machinable metal and with all coatings. Special machines designed to fit any need. Bulletin sent on request.

MORE EFFICIENT UNLOADING

Speedy, efficient unloading is provided by the latest A T & M development in centrifugal design—the two-motor, free-wheeling drive. Positive unloading speeds are furnished by this drive without resorting to slipping clutches, automatic jogging devices or other inefficient methods of obtaining unloading speeds. The two-motor, free-wheeling drive meets the basic factors—a rapid accelerating high-speed centrifugal drive with frequent starting service and a very low constant speed drive with plenty of power. Write for complete details.

CERTIFIED BASKETS

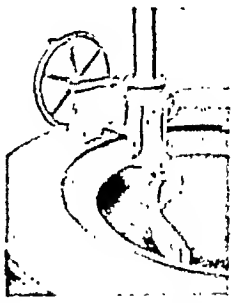
After being put through severe load and speed tests and the regular running test for dynamic balance, A T & M Baskets are given a "certified tag" (stamped into the basket). Here is marked the maximum load and speed rating for the basket. Baskets are actually tested at loads and speeds in excess of the ratings, thus insuring you of safe operation at even the maximum rating.

ENGINEERING SERVICE

American Tool & Machine Company furnishes a fully equipped laboratory and a trained engineering staff to solve all problems involving extraction, dehydration, separation, impregnation, sedimentation, filtration or draining. A wealth of experience (70 years) is at your service with no obligation. Put it up to A T & M engineers. All information is held in strict confidence.

A T & M and associates furnish to centrals and refineries a service that covers complete engineering layout, including buildings and boilers.

A T & M DISCHARGER



Thorough tests in hard service have shown that the A T & M Discharger saves operating time, operator fatigue and maintenance cost. It provides positive and centralized control of the plow throughout its range of movement and is exceptionally compact, requiring a minimum space on the curb and low head room. Adjustable stops prevent waste motion in every direction.

The accompanying illustration shows its simple, rugged construction that insures long service and low maintenance.

DATA INDIVIDUAL MACHINES [illegible]

Diameter of Basket inside *	30	36	42	48
Cubic Feet				
Total	5.7	11.8	17.8	25.0
Under Top Rest	3.2	7.1	9.4	11.0
Normal RPM				
Belt Driven	1500	1300	1000	900
Direct Motor Drive	1140	1140	1140	900
Normal Load per Charge	200	400	550	750
Approximate Shipping Weight				
Belt Driven	4500	6350	7550	9400
Direct Motor Drive	4900	6900	7900	9400
Approximate Overall Height				
Belt Driven	58	68	78	86
Direct Motor Drive	56	66.2	71.2	81.5
Approximate Floor Space required				
Belt Driven	42x56	54x68	64x78	77x93
Direct Motor Drive	42x56	54x68	64x78	77x93

* Measured [illegible]

COMPLETE SUGAR BULLETIN

This bulletin contains complete data on the centrifuging of sugar. In it you will find material on Baskets, Belt Driven centrifugals, Motor Driven centrifugals, etc. You may get your copy by writing to the American Tool & Machine Company at [illegible]

Books on sugar

OFFICIAL AND TENTATIVE METHODS OF ANALYSIS

Association of Official and Agricultural Chemists, new 4th edition. Includes methods of analysis of sugar products. U. S. and possessions, $5.00; other countries.....$5.50

POTENTIOMETRIC TITRATIONS

By I. M. Kolthoff and N. H. Furman, 345 pp., 45 figures (1926). New and authoritative treatise; invaluable to sugar chemists who are interested in H-ion control.....$6.00

PRACTICAL HANDBOOK FOR BEET SUGAR CHEMISTS

By W. Moeller-Krause. 132 pp., 19 illustrations. Rapid methods of technical analysis of products and materials of beet sugar manufacture.....$1.50

Engineering

DISTILLATION PRINCIPLES

By C. Elliott. 166 pp., with diagrams and tables. Deals with the principles of distillation from the theoretical rather than the practical standpoint.$2.00

ELEMENTS OF FRACTIONAL DISTILLATION

By C. S. Robinson. First edition. 205 pp...$2.50

EVAPORATING, CONDENSING AND COOLING APPARATUS

By E. Hausbrand. 468 pp., illustrated. Explanations, formulae and tables for use in practice..$8.00

EVAPORATION

By A. L. Webre, assisted by C. S. Robinson. 498 pp., illustrated. Covers in a masterly way the theory and practice of industrial evaporation, with special chapters on heat balances in cane and beet sugar factories, and evaporation of crystallizing substances. Describes various types of equipment. $8.50

EVAPORATION

By Ed. Koppeschaar, 108 pp. Considers the practice and principles of evaporation in cane and beet sugar factories.....$3.00

HEAT TRANSFER AND EVAPORATION

By W. L. Badger. Over 300 pp., illustrated. Principles, heater and evaporator design, multiple effect operation, etc.....$6.00

FILTERS AND FILTER PRESSES

By F. A. Buhler, translated from the German by J. J. Eastwick. 184 pp., illustrated. A general treatise with a special section for filtration of sugar liquids $5.00

Colloid Chemistry*

COLLOIDS. A TEXTBOOK

By H. R. Kruyt. 286 pp. Second Edition. Translated by H. S. van Klooster. The subject of colloid chemistry is treated in this book as a physico-chemical science.....$3.50

INTRODUCTORY COLLOID CHEMISTRY

By Harry N. Holmes. 198 pp. The author has stressed adsorption, emulsions, and that important group of subjects including interfacial tensions, films, froths, and wetting. Gels, proteins, soaps and catalysis have also been included.....$2.50

LABORATORY MANUAL OF COLLOID CHEMISTRY

By H. N. Holmes. 127 pp. A book from which a chemist can study colloids in his laboratory.$3.25

PHYSICAL PROPERTIES OF COLLOIDAL SOLUTIONS

By Eli F. Burton, 221 pp. Includes theory of stability of colloids and their coagulation.....$6.00

THEORETICAL AND APPLIED COLLOID CHEMISTRY

Ostwald-Fischer. 266 pp. An English translation of an authoritative German work.....$2.50

*The manufacture of sugars from beets and cane involves colloid chemistry at every step. Every sugar chemist should be well grounded in the chemistry and physics of Colloids.

Industrial Alcohol

DISTILLATION OF ALCOHOL FROM FARM PRODUCTS

By F. B. Wright. Not a scientific treatise, but a plain, practical handbook. 12mo., 281 pages. 60 illustrations.....Cloth, $2.50 postpaid

INDUSTRIAL ALCOHOL

By John G. McIntosh. Revised and enlarged by H. B. Stokes. 37 tables, 412 pp. Deals with the production and use of alcohol for industrial purposes, including use as motive power, from beets, grains, sugar, molasses and other materials.....$6.00

Sugar Economics

CAN INDUSTRY GOVERN ITSELF?
(An account of 10 Directed Economies)

By Dr. O. W. Willcox. A full account is given of systems of proration and price control of sugar in 10 representative countries. The author shows how "sugar is pointing the way" to a rational stabilization of industry and agriculture.....$2.75

THE WORLD SUGAR PROBLEM

By Viriato Gutierrez. The author reviews sugar history since the World War, with special attention to the efforts at a solution of sugar problems by international action, and suggests a policy for the future. The point of view is Cuban. 188 pp.$1.50

Dictionaries

DICTIONARY OF TECHNICAL TERMS

English-Spanish and Spanish-English by Ponce de Leon. Very complete.....$15.00

SPANISH-ENGLISH and ENGLISH-SPANISH

By Lopez & Bensley.....$8.00

GERMAN-ENGLISH TECHNOLOGICAL & COMMERCIAL DICTIONARY OF THE SUGAR INDUSTRY

By Walter Kersten, 28 photostat pages 9 x 5..$3.00

LEXICON

Sugar Terms in 12 Languages by Romain Shemenesky. $3.00

Reference Books

SUGAR REFERENCE BOOK AND DIRECTORY 1938

Contains production statistics for all important countries, graphs and tables of prices, a review of principal developments of the year, lists of sugar factories in all countries, etc.....$5.25

PROCEEDINGS OF THE ASSOCIATION OF SUGAR TECHNOLOGISTS OF CUBA (Annual)

Bound volumes of the papers read at the yearly conventions of the association beginning 1928 Paper. $3.00

MEMORIAS DE LA ASOCIACION DE TECNICOS AZUCAREROS DE CUBA

Same as the above, in Spanish.....$3.00

FACTS ABOUT SUGAR

Complete yearly issues durably bound in cloth, with full index.....$15.00

THE CUBA SUGAR MANUAL

Compiled by A. B. Gilmore, publisher. A handbook of information (in English and Spanish) concerning the manufacturing and cane growing equipment and resources of Cuban sugar companies. $10.00

THE HAWAII SUGAR MANUAL

Uniform with the foregoing. Text in English only. $10.00

THE LOUISIANA SUGAR MANUAL

Uniform with the foregoing. Text in English only. $5.00

THE PUERTO RICO SUGAR MANUAL

Uniform with the foregoing. Text in English only. $10.00

WORLD SUGAR STATISTICS

Published by F. O. Licht, Magdeburg. Production, consumption, exports and imports of all countries. English and German. 1937/38.....$7.00

Facts About Sugar, *Book Department,* *95 River Street Hoboken, N. J.*

THE WESTERN STATES MACHINE COMPANY

Incorporated

Centrifugal *Processes*

350 Madison Avenue, New York, N. Y., U.S.A.
Plant: Hamilton, Ohio

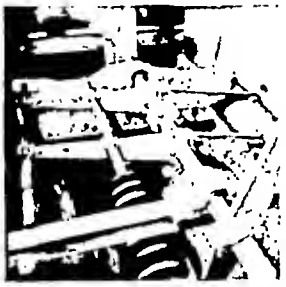
Uniformity in operation means uniformity in finished product.

A RECORD OF IMPROVEMENT

The Western States equipment and processes produce greatest possible savings as well as a better and more uniform sugar.

During the past few years, the majority of all cane and beet sugar centrifugals sold in the United States, as well as many installations in foreign countries, have been Roberts centrifugals.

MASSECUITE FLUIDITY

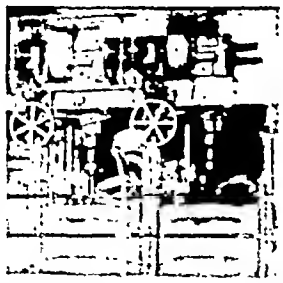


The Stevens (Patented) Massecuite Heat Treatment System supplies to the centrifugal the necessary amount of massecuite for each cycle, heated to the desired temperature to break down its viscosity and automatically timed and mingled without dilution or caramelization. This system is essential to maximum efficiency, economy and uniformity of centrifugal operations and is used for all types of magmas and massecuites.

MOST RAPID DISCHARGING

Roberts (Patented) "Speedex" Dischargers with metal tip. No more troublesome or short lived fibre tips. This discharger cuts through any crusted surface, is easier on linings, on the centrifugal itself, and on the unloading torque.

THE ROBERTS GEAR DRIVEN CENTRIFUGAL 1400 to 2400 R. P. M.



Equipped with Roberts (Patented) Clutch and designed to obtain proper acceleration and high centrifugal forces to suit the type of massecuite being purged. The Western States Machine Co. holds exclusive patent rights in the United States on purging of sugar massecuites and magmas at centrifugal forces in excess of 800 times gravity. Licenses may be obtained by sugar producers for the use of these and other of our patented improvements.

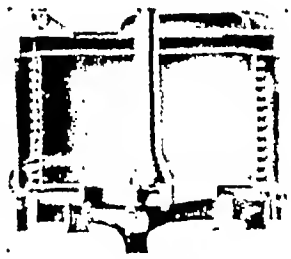
SYRUP ELIMINATION

Roberts centrifugals and centrifuging processes give new and outstanding purging characteristics, bringing the centrifugal from loading speed to any required maximum speed so rapidly that 95% of the green liquors are eliminated before wash water is supplied, reducing wash water requirements to a minimum. This gives perfect syrup elimination and the full benefits of massecuite heat treatment.

PERFECT FILTRATION

Roberts (Patented) centrifugal baskets and linings allow 100% filtration. The Roberts all-welded steel baskets with special linings are the only centrifugal baskets capable of giving 100% filtration over every inch of the basket wall, permitting rapid syrup elimination and a uniformly clean sugar wall.

PURITY CONTROL



The Roberts (Patented) Automatic Syrup Separator makes a sharp and accurate syrup separation of the wash from the green liquor on the curb wall, allowing a spread of from 10 to 12 points in liquor purity or a wash liquor purity equal to or greater than the original pan purity, which can be sent directly back to the pan for reboiling. All impurities are separated at the beginning of the process and kept from re-entering it. This device is necessary to most economical process operation, using heat treating, rapid acceleration and perfect filtration.

UNIFORM SUGAR

The Roberts (Patented) Automatic Cycle Control regulates the cycle components and washing operations. Every phase of the centrifugal cycle is automatically timed and controlled from the time of loading until the basket is ready for discharging.

The control is built into and becomes part of the centrifugal itself. It is simple, yet durable, with no intricate air lines to become clogged or delicate mechanism to get out of order.

The Roberts controls are necessary for effective syrup separation and over-all process efficiency.

ENGINEERING SERVICE

The Western States Machine Co. retains the services of some of the foremost sugar technologists and research engineers, who have made a serious study of the purging of all types of magmas and massecuites. These men have amassed a vast fund of research data which is yours for the asking.

In order to show the customer where the greatest saving can be made, a questionnaire has been prepared which will be sent to you without any obligation on your part, and all information will be kept strictly confidential.

Write for the questionnaire.

FARREL SUGAR MACHINERY

- Cane Grinding Mills
- Crushers — Single, Double and Multiple
- Rolls—Complete
- Roll Shells
- Roll Shafts — Carbon and Special Alloy
- Mill Drives—for Mills and Crushers
- Gear Reducing Units
- Gears—Spur, Helical and Herringbone Tooth, Cut
- Cane Knives and Levellers
- Feeder Carriers
- Intermediate Carriers
- Juice Strainers and Trash Elevators
- Tramp Iron Magnets
- Hydraulic Pressure Regulators
- Hydraulic Accumulators
- Scharnberg Hydraulic Packing Rings
- Repairs of All Kinds

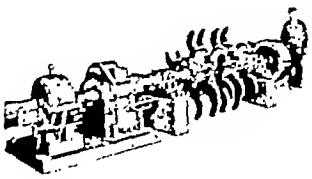
CANE MILLS AND CRUSHERS

Built in single three-roller mills or in tandems of 6, 9, 12, 15 or more rolls, with or without a crusher. Massive, well proportioned housings with metal disposed to the best advantage; improved hydraulic cap of simple construction with removable cylinder having only one packing; crown-wheels with specially designed teeth to give maximum variation of roll centers. Accessibility and interchangeability of parts are particular features. Used by leading sugar producers in all parts of the world.

Electric Motor Drive

SUGAR MILL ROLLS

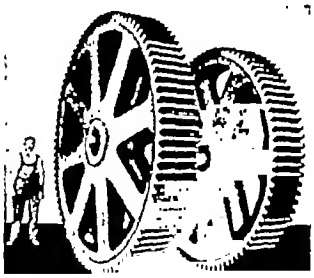
Farrel Rolls contain only quality materials of known characteristics, selected to rigid specifications, prepared according to the proved Farrel formula of roll mixture and subjected to exacting metallurgical control through the whole manufacturing process. The open grain and texture of the metal give exceptional gripping and feeding capacity, which assure maximum extraction and tonnage. Mounted on carbon or alloy steel shafts by a method which is a positive prevention of the shells becoming loose on the shafts.



Cane Knives with Turbine Drive

MILL DRIVES

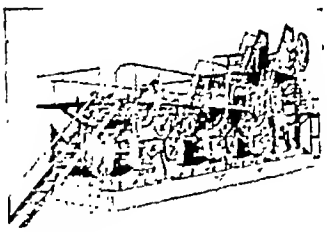
Drives and Gear Trains of any power for electric motors or engines. Individual Unit Drives or Single Drives for complete tandems. Accurately generated, straight tooth spur, or continuous tooth herringbone gears. Gears may be entirely enclosed and run in oil. Design and material provide smooth running and great durability.



Mill Drive Gears

REVOLVING CANE KNIVES

For shredding and cutting any kind of cane. The patented, serrated edge knives give greater shredding action. Long shreds are produced which provide a more uniform feed and form a blanket of such a character that maceration is more effective. Many sets in successful operation show increase of mill capacities and sucrose extraction with negligible maintenance costs. Arranged for electric motor, engine, turbine or belt drive.

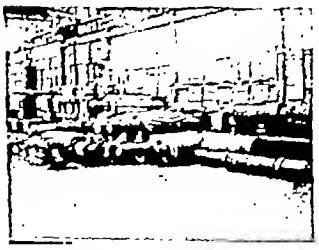


9-Roller Mill with 2-Roller Crusher and Carrier

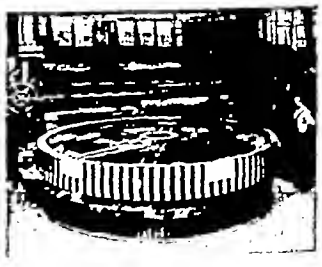
REPAIRS AND REPLACEMENTS

We are prepared to supply rolls, rebells and shafts, housings, bearing boxes and brasses, crown-wheels, gears, gear rims or spiders, turnplates, beams and other repair parts for the maintenance of existing mills of any type.

Exceptional plant facilities and overnight freight delivery alongside steamer at the Port of New York, only 70 miles from our Ansonia Plant, enable us to give quick service on repairs and replacements.



Sugar Mill Rolls and Parts



Fitting New Rim to Sugar Mill Drive Gear

FARREL-BIRMINGHAM COMPANY, INC.

Successor to Farrel Foundry & Machine Co. (Est. 1848) and Birmingham Iron Foundry (Est. 1836)

681 Elizabeth St., Ansonia, Conn., U. S. A.

New York · Havana · San Juan · Buenos Aires · Pernambuco · Manila

THE JEFFREY MANUFACTURING COMPANY

EXPORT DIVISION . . . . . COLUMBUS, OHIO, U. S. A.

Cable Address: "Jeffrey—Columbus"

In Argentina—Carlino Hermanos & Cia—Tucumán
In Brazil—Sao Paulo—Sociedade Technica e Commercial Ltda., Caixa Postal 3773—Sao Paulo
In Cuba—William A. Powe, Edif. La Metropolitana 214—Havana
In Hawaii—W. A. Ramsay, Ltd.—Honolulu
In Java—N. Y. Het Technisch Bureau, Vraag En Aanbod—Soerabaia
In Mexico—J. Dale Reynolds, Apartado No. 428—Monterrey
In Philippine Islands—Manila Machinery & Supply Co., Inc.—P. O. Box 607, Manila
In Puerto Rico—Sucesores de Abarca, P. O. Box 228—San Juan
In South Africa—Jeffrey-Galion (Pty.) Ltd.—P. O. Box 4094—Johannesburg
In Trinidad—Industrial Agencies, Ltd.—7, High St., San Fernando

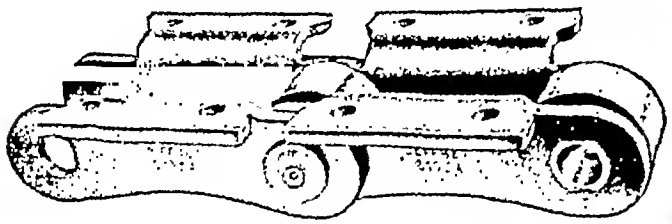
Manufacturers of Sugar Mill Machinery, Chains, Reduction and Transmission Equipment

PRODUCTS:

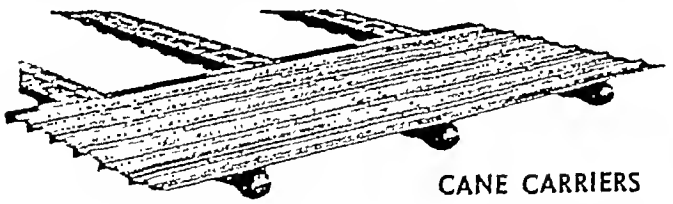
Cane shredders; grinders; crushers; chains for every elevating, conveying and driving need; sprockets and attachments; cane carriers; intermediate carriers; belt, bagasse, apron, scraper and chain conveyors; bucket, barrel and trash elevators; spiral conveyors; juice strainers; sugar minglers; portable bag stackers; wood apron conveyors; belt idlers; gears; bearings; couplings; take-ups; and buckets.

CHAINS:

Correctly designed chains are essential if your mill is to function economically and successfully. Jeffrey knows what is desired of chains and material handling equipment in sugar mill service . . . can help you meet production schedules. There is a type and size of chain for every service . . . each is durable and dependable.



Jeffrey No. 2178—A steel thimble roller chain for cane carrier service. It is of sturdy construction . . . will last longer with fewer replacements.

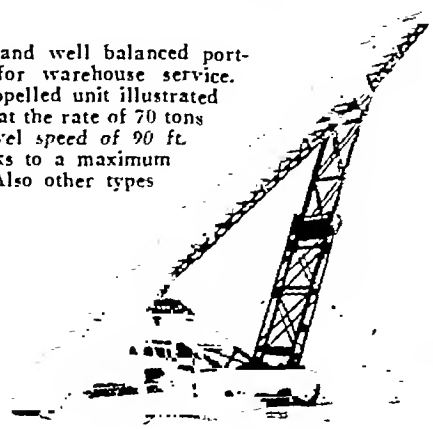


CANE CARRIERS

A section of Jeffrey steel cane carrier apron with three strands of No. 2178-A cane carrier chain. This type of carrier will take you through many grinding seasons with the minimum amount of attention and upkeep.

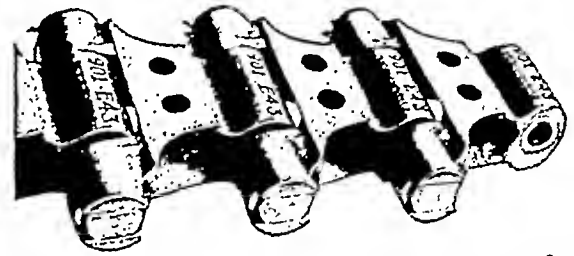
BAG STACKERS

Sturdily constructed and well balanced portable bag stackers for warehouse service. The portable self-propelled unit illustrated handles 325 lb. bags at the rate of 70 tons per hour, has a travel speed of 90 ft. per minute and stacks to a maximum height of 25 feet. Also other types to suit conditions.

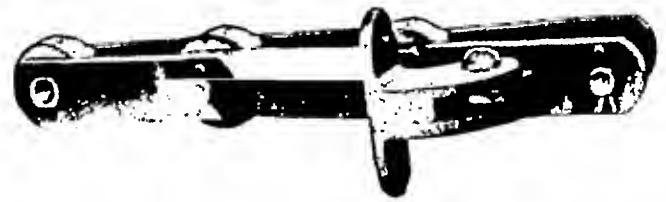


Literature covering every type of Jeffrey equipment in the handling of sugar, shredding the cane and transmission of power, will be sent upon request.

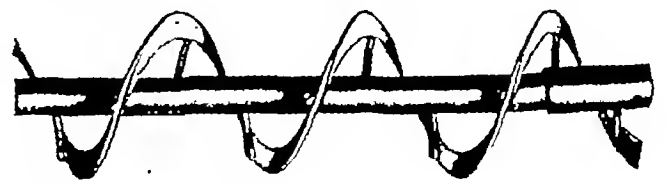
Jeffrey No. 1½ "D" special malleable roller chain for intermediate carrier service. Made of 'Perduro' this type of chain will withstand corrosion, abrasion, fatigue loading and give many years of efficient service.



Jeffrey No. 901 E 43 intermediate carrier chain, of refined malleable iron with renewable hardened steel bushings. Also available in 'Perduro' with stainless steel bushings and pins.

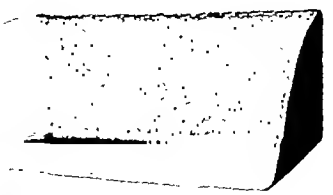


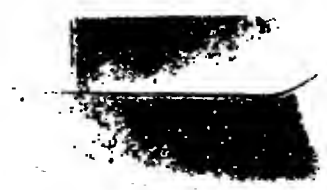
Jeffrey No. 1868 bagasse carrier chain with flight attachments. This chain is 6" pitch of the offset side bar type with 5/8" diameter pins and 3" diameter rollers.



SPIRAL CONVEYORS

Have a broad reputation for dependability and economy. Made in all the standard sizes and stocked to meet the demands of the trade. Sectional and continuous flight and ribbon types with necessary troughs, hangers and bearings.





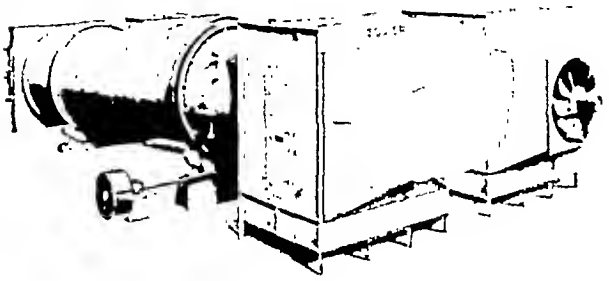
A complete line of superior quality, malleable iron buckets of approved pattern. The Style C and Style A are shown. Also steel boots, casings and standard bucket elevators for every sugar mill service.

The GEO. L. SQUIER MFG. CO.

BUFFALO, N. Y.

Engineers and Manufacturers of Sugar Machinery and Complete Sugar Factories

SQUIER DRYERS



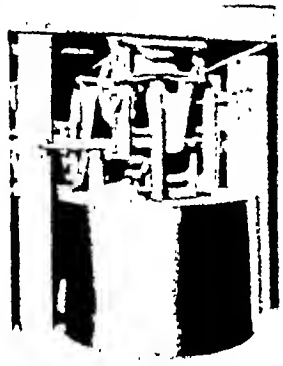
We have been making dryers for the sugar industry for over 80 years. During that time we have solved all types and kinds of drying problems. There are Squier dryers to successfully dry raw sugar, plantation white sugar, refined sugar, and mixtures of molasses and chopped foliage. All dryers are mounted on frictionless rollers. Flights are scientifically placed with alternately straight and lipped buckets, to give an even and complete distribution of falling sugar over the entire drum section. Squier dryers operate with a minimum amount of fuel and dry your sugar with maximum brilliance and luster.

SQUIER COMPLETE FACTORIES

The Geo. L. Squier Mfg. Co. not only offers a complete line of sugar mill machinery but is also prepared to design and erect complete sugar factories in any part of the sugar producing world. By arranging to have Squier do the entire job, you are sure of having a completed sugar factory that will give you maximum production at lowest cost, and you have the further advantage of placing all of the responsibility squarely on the shoulders of one firm. For complete information on the entire SQUIER line of sugar mill equipment, write for our new catalog No. 3055-E.

SQUIER CENTRIFUGALS

Squier Centrifugals are built to permit rapid acceleration up to top speed. They are also equipped with a braking system which permits rapid dissipation of heat, stops the basket quickly when the spinning period is over. This accounts for the unusually high production obtained on all Squier installations.

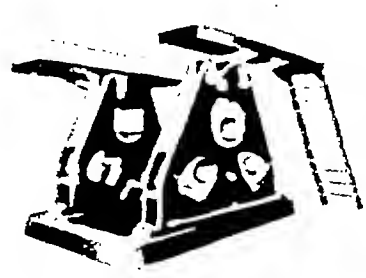


Baskets are enclosed in heavy welded steel plate casings.

Every Squier Centrifugal is completely erected and tested in the factory before it is sent to the customer.

SQUIER MILLS

The more juice you can extract from your sugar cane the more profit you can make on each ton milled. That's why you should be interested in the Squier mill with patented triangular stress housing. This special housing enables you to get greater extraction from larger quantities of sugar cane at higher speeds without the risk of breaking and consequent shutdowns, which would mean enormous losses to the mill. The roll shells of these Squier mills are cast of special alloy. Each casting is checked for hardness, porosity, grain structure and other physical properties to insure its gripping power and wearing qualities in operation. Squier Triangular Stress Mills are available in a wide range of sizes to meet every milling requirement.



THE DICALITE COMPANY

520 N. Michigan Ave. CHICAGO
120 Wall Street NEW YORK
756 South Broadway LOS ANGELES

DISTRICT OFFICES: Boston Philadelphia St. Louis Cincinnati Kansas City San Francisco

Plants and Laboratories located in the San Pedro Hills near Los Angeles Harbor, California and Oromite, Oregon

LCL STOCKS ALSO CARRIED AT DENVER, PORTLAND, SEATTLE, MONTREAL, LONDON AND ANTWERP

2 Sources of Dicalite Products

The tremendous quantity of high quality diatomaceous silica obtainable from the two sources (shown below) assures a constant, practically inexhaustible supply of all Dicalite Filteraids and other products.

There are nine Dicalite Filteraids from which to select the right one

Dicalite has nine distinctive grades of Filteraids, each of which is produced to meet certain definite requirements. They are in use in important sugar plants throughout the world, and are giving the desired clarity and maximum flowrate at the lowest cost per unit of liquor filtered.

Dicalite Superaid
Dicalite UF Grade
Dicalite Speedflow
Dicalite Special Speedflow
Dicalite 20
Dicalite Speedplus
Dicalite 40
Dicalite Speedex
Dicalite 4200

Making the Selection

The selection of the proper grade and quantity of filteraid to be used for any sugar liquor depends on the size and nature of the suspended particles to be filtered out. Long experience in filtration practice has established the grade and quantity of Dicalite Filteraids which should be used with the different liquors to assure maximum flowrate and best clarity at the lowest cost. Recommendations will be made on request.

Exacting Control and Production assure Uniform High Quality of all Dicalite Filteraids

All Dicalite Filteraids are manufactured from only the highest quality diatomaceous silica in which spicular or elongated diatoms predominate which types are recognized internationally as the best type of diatomaceous earth for industrial use. They are produced under our own patented processes and under the direction of experienced technological experts. This assures the high uniform quality and superiority of Dicalite Filteraids, bag-to-bag, and therefore, lowest cost per ton of sugar filtered.

Other Products

Dicalite makes also high quality Industrial and Building Insulating Materials, Inerts and Flatting Agents for Paints, Mineral Filters, Absorbents, Abrasives and Admixtures for Concrete and Asphalt.

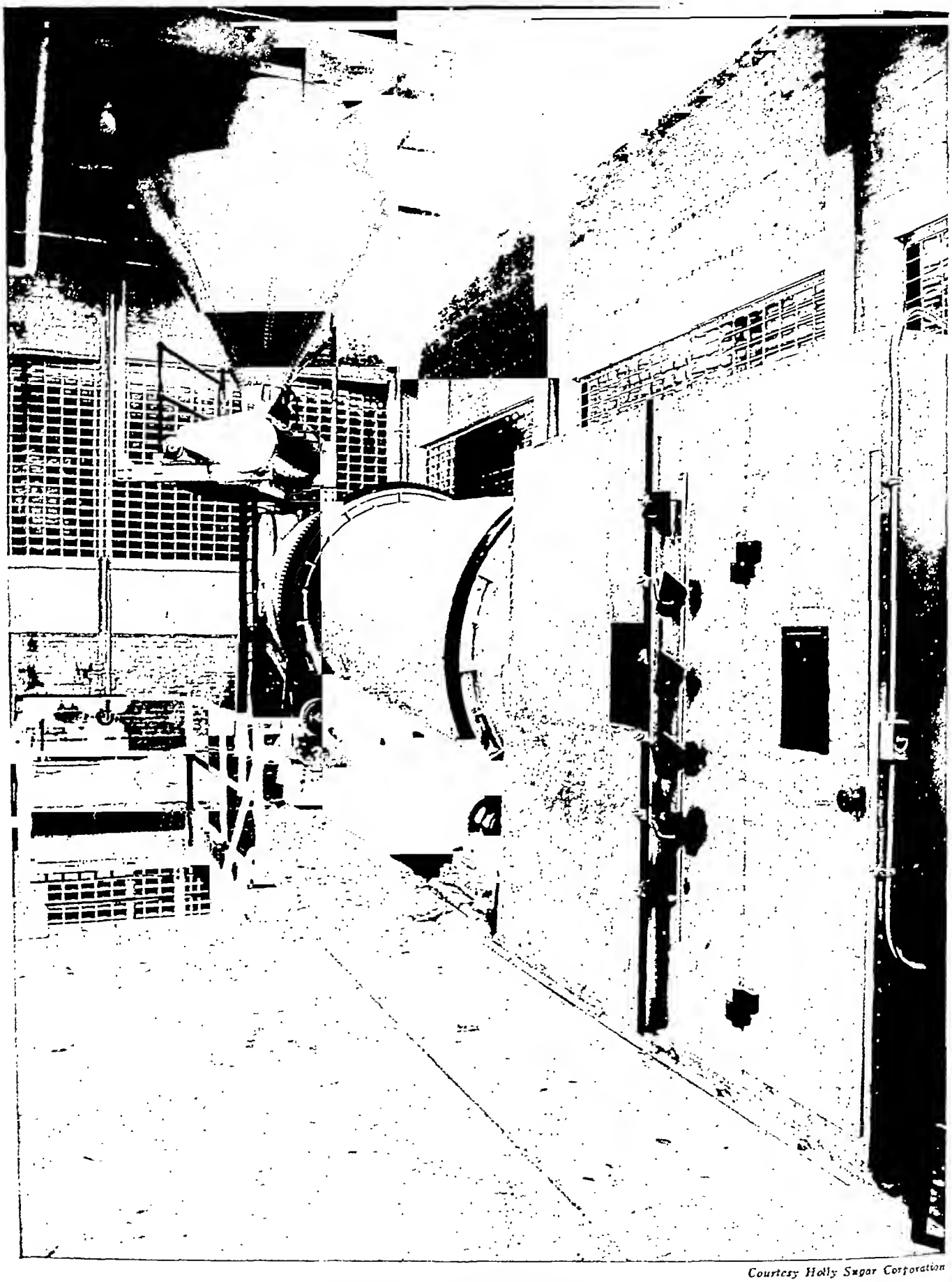
Dicalite Service

Dicalite's close proximity to the steamship piers at Los Angeles Harbor, and direct rail lines, insures much quicker delivery to all points whether shipment be made via rail or water. Transportation via water is lower than from any other source. In addition, complete stocks for less than carload delivery are carried in all cities noted above and in many foreign countries.

An airview of Dicalite's Plant and a portion of the deposits of diatomaceous silica, at Palos Verdes, near Los Angeles, California.

Another source of high quality diatomaceous silica and Dicalite Products is located at Oromite, Oregon, shown in part above.

Table of Contents



Courtesy Holly Sugar Corporation

Sugar Granulator and Wet Box in the New Beet Sugar Factory at Hardin, Montana

The United States Sugar Act of 1937

THE Sugar Act of 1937, approved by the President of the United States on September 1, by that action became the law under which the sugar industry of the United States will operate during the next three years. A digest of the act is presented herewith.

History of Act

Introduced in the House of Representatives (H. R. 7667), June 24, 1937, by Representative Jones, of Texas (a duplicate bill was introduced in the Senate on the same day by Senators O'Mahoney and Adams). Passed by the Senate, August 19. Passed by the House, August 20. Approved by the President, September 1, and effective from that date.

Purposes

"To regulate commerce among the several States, with the Territories and possessions of the United States, and with foreign countries; to protect the welfare of consumers of sugars and of those engaged in the domestic sugar-producing industry; to promote the export trade of the United States; to raise revenue; and for other purposes."

Definitions

... .

of pounds by the figure obtained by adding to 0.93 the result of multiplying 0.0175 by the number of degrees and fractions of a degree of polarization above 92 degrees; (4) sugar and liquid sugar, testing less than 92 degrees, by dividing the number of pounds of total sugar content thereof by 0.972.

"Total Sugar Content" means the sum of the sucrose (Clerget) and reducing or invert sugars contained in any type or grade of sugar or liquid sugar.

"Quota" means (1) the quantity of sugar which may be brought or imported into the continental United States, for consumption therein, during any calendar year, from Hawaii, Puerto Rico, the Virgin Islands, the Philippine Islands, or foreign countries; (2) the quantity of sugar produced from sugar beets or sugar cane grown in the continental United States which during any calendar year may be shipped, transported, or marketed in interstate commerce; (3) the quantity of sugar which may be marketed in the Territory of Hawaii or Puerto Rico for consumption therein.

"Producer" means a person who is the legal owner of a crop or portion of a crop of sugar beets or sugar cane grown on a farm for the extraction of sugar.

"Secretary" means the Secretary of Agriculture.

normally would be marketed. In determining such proportionate share, the Secretary may take into account the past production of the farm and its ability to produce, and he shall, insofar as practicable, protect the interests of new producers, small producers, and producers who are tenants, adherent planters, or share-croppers.

Payments shall be effective with respect to sugar from sugar beets or sugar cane marketed (or processed by the producer) on and after July 1, 1937.

The Secretary is also authorized to make payments with respect to abandonment of planted acreage and crop deficiencies of harvested acreage resulting from drouth, flood, storm, freeze, disease, or insects, determined in accordance with regulations issued by the Secretary, on a basis as follows: (1) with respect to the bona fide abandonment of planted acreage, one-third of the normal yield of commercially recoverable sugar per acre for the farm; (2) with respect to crop deficiencies of harvested acreage, the excess of 80 per cent of the normal yield of commercially recoverable sugar for such acreage for the farm over the actual yield.

Base Rate of Payment

The base rate of payment shall be 60 cents per hundred pounds of sugar or liquid sugar, raw value. The total payment shall be the product of the base rate multiplied by the amount of sugar with respect to which payment is to be made, except that reductions shall be made from such payment in accordance with the following scale for productions in excess of 500 tons, raw value, of sugar:

Quantity, Tons	Reduction in Base Rate
500 to 1,500	$0.05
1,500 to 6,000	.075
6,000 to 12,000	.100
12,000 to 30,000	.125
More than 30,000	.300

Application for payment must be made by the producer (or his legal representative or heirs). Payments may be made to one producer of a group, provided all producers on the farm designate such producer as sole recipient of the payment, or to a person who is not a producer, provided such person controls the land included within the farm and is designated by the producer or producers as the recipient.

In carrying out the provisions relating to payments (and also to quotas) the Secretary is authorized to utilize local committees of producers, state and county agricultural conservation committees, the Agricultural Extension Service, and other agencies, and may deduct from the payments authorized all or part of the expenses of such agencies. The facts constituting the basis for any payment, or the amount thereof, are reviewable only by the Secretary, whose determinations are final.

Excise Taxes

Upon manufactured sugar manufactured in the United States on and after the enactment of the act there is levied a tax, to be paid by the manufacturer, at the following rates: (1) on all manufactured sugar testing by the polariscope 92 sugar degrees, 0.465 cent per pound, and for each additional sugar degree, 0.00875 cent per pound additional, and fractions of a degree in proportion; (2) on all manufactured sugar testing by the polariscope less than 92 sugar degrees, 0.5144 cent per pound of the total sugars therein.

Any person who acquires any sugar which is to be manufactured into manufactured sugar but who, without further refining or otherwise improving it in quality, sells such sugar as manufactured sugar or uses it as manufactured sugar in the production of other articles for sale shall be considered the manufacturer and, as such, liable for the tax with respect thereto.

The manufacturer shall file a return on the last day of each month and pay the tax with respect to manufactured sugar (1) which has been sold, or used in the production of other articles, by the manufacturer during the preceding month, and (2) which has not been so sold or used within twelve months ending during the preceding calendar month, after it was manufactured. The first return and payment shall not be due, however, until the last day of the second month following that in which the tax takes effect.

No tax shall be required to be paid upon the manufacture of manufactured sugar by, or for, the producer of the sugar beets or sugar cane from which such sugar was derived, for consumption by the producer's own family, employees, or household.

Import Compensating Tax

In addition to any other tax or duty imposed by law, there shall be imposed a tax upon articles imported or brought into the United States as follows: (1) on all manufactured sugar testing by the polariscope 92 sugar degrees, 0.465 cent per pound, and for each additional degree 0.00875 cent per pound additional, and fractions of a degree in proportion; (2) on all manufactured sugar testing less than 92 sugar degrees, 0.5144 cent per pound of the total sugars therein; (3) on all articles composed in chief value of manufactured sugar, 0.5144 cent per pound of the total sugars therein.

Such tax shall be levied, assessed, collected, and paid in the same manner as a duty imposed by the Tariff Act of 1930, and shall be treated as a duty imposed by such act, except that for the purposes of the so-called flexible tariff and trade agreement provisions such tax shall not be considered a duty or import restriction, and that no preference with respect to such tax shall be accorded any articles imported or brought into the United States.

Excise Tax Refund

Upon the exportation to a foreign country, or the shipment to any possession of the United States except Puerto Rico, of any manufactured sugar, or article manufactured wholly or partly from manufactured sugar, with respect to which excise tax has been paid, the amount of such tax shall be paid by the Commissioner of Internal Revenue to the consignor, or to the shipper if the consignor waives claim in his favor; but no such payment shall be allowed with respect to any manufactured sugar, or article, upon

which a drawback of any tax paid under the import compensating tax provisions has been or is to be claimed.

Upon the use of any manufactured sugar, or article manufactured therefrom, as livestock feed, or in the production of livestock feed, or for the distillation of alcohol, the Commissioner of Internal Revenue shall pay to the person so using such sugar, or article manufactured therefrom, the amount of any excise tax paid with respect thereto.

No refund, however, shall be allowed unless a claim is filed by the person entitled thereto within one year after the right to such payment has accrued.

Except as otherwise provided, the taxes imposed shall be collected by the Bureau of Internal Revenue under the direction of the Secretary of the Treasury. Such taxes shall be paid into the Treasury of the United States.

Definitions

For tax purposes, the term "manufactured sugar" means any sugar derived from sugar beets or sugar cane which is not to be, and which shall not be, further refined or improved in quality; except sugar in liquid form which contains non-sugar solids (excluding any foreign substance added) equal to more than 6 per cent of the total soluble solids, and except also syrup of cane juice produced from sugar cane grown in the continental United States.

The term "total sugars" means the total amount of the sucrose (Clerget) and of the reducing or invert sugars.

The term "United States" shall be deemed to include the States, the Territories of Hawaii and Alaska, the District of Columbia, and Puerto Rico.

The tax provisions become effective on the date of enactment of the act.

jurisdiction to enforce the provisions of the act and orders or regulations issued pursuant thereto.

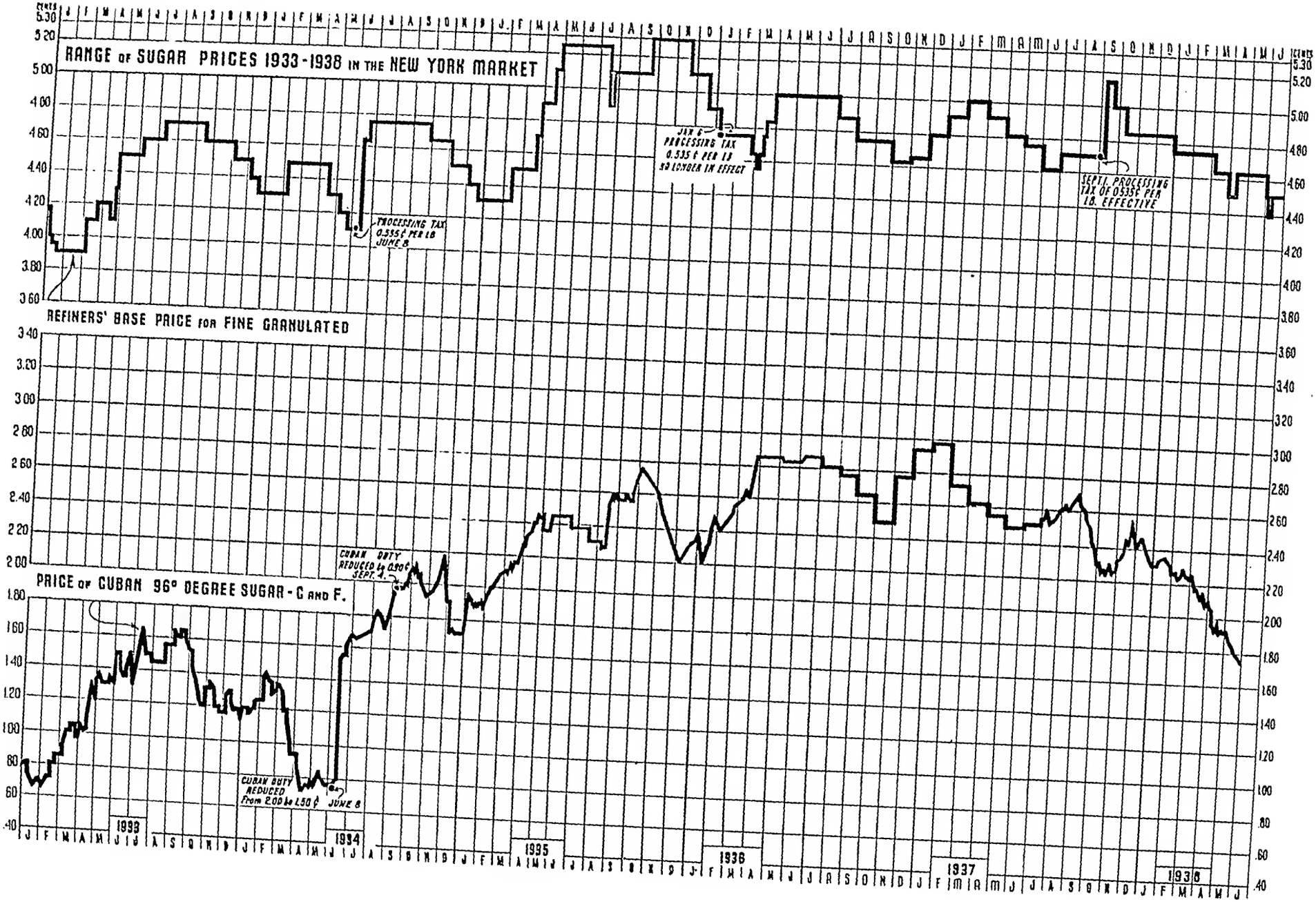
Any person who knowingly violates, attempts to violate or aids in the violation of any of the provisions relating to quotas shall forfeit to the United States three times the market value of the quantity of sugar by which any quota, proration, or allotment is exceeded, or of the quantity brought or imported into the continental United States after the quantities specified in the direct-consumption quotas have been filled.

Any person engaged in the manufacturing, marketing, or transportation of sugar, and having information which the Secretary deems necessary to enable him to administer the provisions of the act, willfully failing or refusing to furnish such information, or furnishing willfully false information, is liable to a penalty of not more than $1,000 for each violation.

No person engaged in an official capacity in the administration of the act shall invest or speculate in sugar, contracts relating thereto, or the stock or membership interests of any association or corporation engaged in the production or manufacturing of sugar. The penalty for violation is a fine of not more than $10,000, or imprisonment for not more than two years, or both.

Suspension of Provisions

Whenever the President finds and proclaims that a national or economic or other emergency exists with respect to sugar, he shall by proclamation suspend the operation of the quota or conditional payment provisions, which he determines should be suspended, and thereafter the operation of such provisions shall continue in suspense until the President finds and proclaims that the facts which oc-


RANGE OF SUGAR PRICES 1933-1938 IN THE NEW YORK MARKET
CENTS
5.30
5.20
5.00
4.80
4.60
4.40
4.20
4.00
3.80
3.60
PROCESSING TAX 0.535¢ PER LB JUNE 8
JAN 6 PROCESSING TAX 0.535 ¢ PER LB NO LONGER IN EFFECT
SEPT. PROCESSING TAX OF 0.535¢ PER LB. EFFECTIVE
REFINERS' BASE PRICE FOR FINE GRANULATED
3.40
3.20
3.00
2.80
2.60
2.40
2.20
2.00
CUBAN DUTY REDUCED to 0.90¢ SEPT. 4.
PRICE OF CUBAN 96° DEGREE SUGAR - C AND F.
1.80
1.60
1.40
1.20
1.00
.80
.60
.40
CUBAN DUTY REDUCED From 2.00 to 1.50 ¢ JUNE 8
1933
1934
1935
1936
1937
1938

The Operation of the International Sugar Agreement

By George Gordon Paton

Economist of the New York Coffee and Sugar Exchange

THE world sugar industry was virtually prostrated during most of the present decade, suffering from a combination of chronic maladies—over-production, world depression, extreme nationalism among nations. Resulting starvation prices for sugar brought low wages for workers, lost dividends for investors, and complete loss of capital for many who had had the courage to risk their funds in the sugar industry. Today the whole sugar world rejoices at the prospect of a complete recovery for the patient although the period of convalesence must naturally be a protracted one.

There have been three international attempts at the betterment of conditions in the world sugar industry—the Brussels Convention, concluded in 1902; the Chadbourne Plan, 1930-35; and the International Sugar Agreement, signed by twenty-one countries in London, May 6, 1937, and since ratified by all but one country. It is unnecessary to consider the first two agreements other than to mention that the Brussels Convention, which tackled the problems of that time from the angle of restraint of higher tariffs, bounties, and preferential treatment, was fairly successful in obtaining results but fell apart with many other "scraps of paper" during the World War. The Chadbourne Plan, which is still fresh in the minds of most of the sugar trade, was not sufficiently broad in scope or definite in design to meet the stringent needs of the situation. It is with the latest agreement that this article deals—an agreement which should be held up for the world to see as a remarkable example of what can be accomplished in the field of international cooperation.

Task of Council Delegates

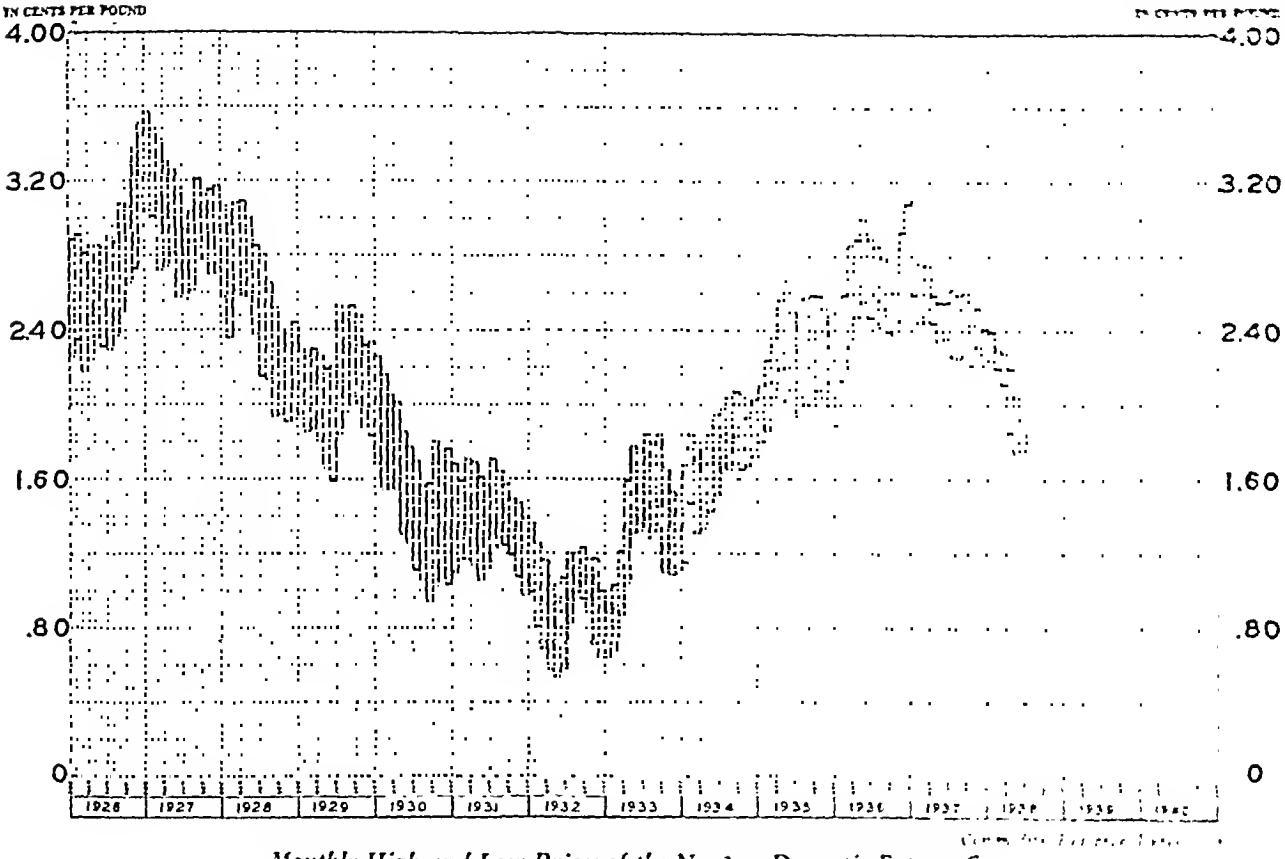
At the third meeting of the International Council, governing body of the Agreement, held in London, July 5, 1938, the delegates were faced with what appeared to be a hopeless task. They must have been dismally discouraged when thinking of the high hopes held in May of the previous year, hopes which had all been dashed to earth. True, they could console themselves by reviewing the facts and enumerating the unforeseen events which had mangled their well laid plans. They knew that few men could blame them for not predicting or even imagining the decline in world business, and prices, which had really only started as they signed their names to the Agreement. The war in the Far East which so drastically reduced Java's market there and dislocated their estimates of world market demand was another catastrophe they could not have been expected to foresee.

They had every reason to be confident that a workable plan had been adopted which would raise prices to a more remunerative level. The history of sugar's dire state they fully knew. The rapid expansion of production in Europe once the trials and tribulations of the World War were in the background; the increased production in the British Colonies and Dominions, the insular possessions, and on the mainland of the United States, all encouraged by protective tariffs or bounties or both; the tendency of most nations to become self sufficient no matter what the cost; all this they recognized. They realized that the Chadbourne Plan had failed primarily because it did not include the United States and the United Kingdom.

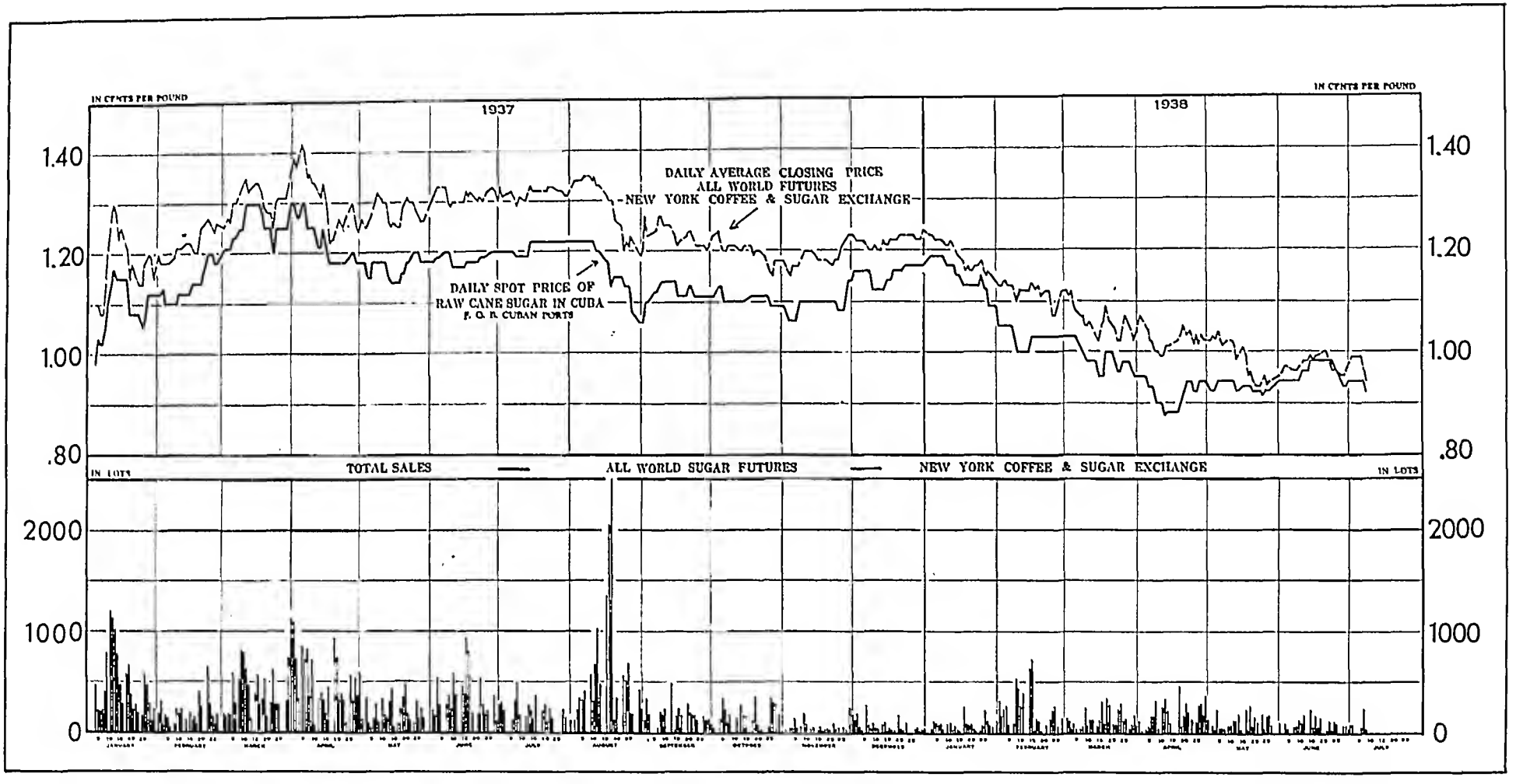
Terms of the Agreement

The plan they promulgated and signed in May, 1937, seemed to meet all difficulties and provide for all eventualities. It included, except Japan, all the principal producing and consuming countries of the world. The exporting nations agreed to accept fixed quotas for shipment each year; the United Kingdom limited home production and accepted fixed limitations on shipments from the Colonies; the Dominions accepted fixed quotas only to be increased as the United Kingdom consumption rose; the United States agreed to retain the status quo, having already adopted a quota system which virtually froze domestic production to the limits of the United States consumption and assured Cuba a market for a definite percentage of the United States demand. There were a few admitted faults with the agreement, the main one being that initial basic quotas were fixed in excess of estimated world requirements. However, it was expected that certain countries would forego part of their allotments, which they did. It was also thought that consumption which had been in a rising trend, would continue to expand and take up the balance of the slack between supply and demand. This however did not materialize due to the world depression and the conflict in the Far East which reduced demand there from about 600,000 to 200,000 tons.

The agreement was signed for a five year period to commence September 1, 1937. The first meeting of the International Council was held in October, 1937. At that time only a handful of countries had been able to accomplish the long drawn out formalities necessary for legal ratification. Despite this, the pact was declared in force as of September 1. Although it appeared at that time that things were not to run as smoothly as expected, no steps were taken to adjust quotas.



Monthly High and Low Prices of the No. 3 or Domestic Futures Contract on the New York Coffee and Sugar Exchange from 1926 to 1938.



Commodity Research Bureau, Inc.

Closing Prices of the No. 4 or World Sugar Contract on the New York Coffee and Sugar Exchange from January 4, 1937, When Trading in the Contract Was Inaugurated, to July 8, 1938.

Exports and Export Quotas of Exporting Countries in the International Sugar Agreement

(Metric Tons)

Exporting Country	Net Exports September-August 1934-35	1935-36	1936-37	Basic Quotas 1937-38 and 1938-39	Revised Quotas 1937-38	Revised Quotas 1938-39
Belgium (including Belgian Congo) (1)	17,724	—15,699	—20,501	20,000	4,750	15,500
Brazil	60,615	105,050	4,005	60,000	14,250	54,000
Cuba (exports other than to United States)	945,645	976,984	751,463(6)	940,000	895,000	855,000
Czechoslovakia	219,501	160,830	319,792	340,000*	525,000	272,000
Dominican Republic (2)	498,170	434,807	482,526	400,000	380,000	374,000
France				55,000 (a)		
Germany	—18,725	13,141	—4,221	120,000	28,500	83,200
Haiti	32,966	55,141	32,719	52,500	50,875	29,900
Hungary	24,951	9,271	55,368	40,000	9,500	52,400
Netherlands (including overseas territories) (3)	1,122,549	872,892	1,125,656	1,050,000	997,500	973,500
Peru	324,772(4)	304,797	330,628	330,000	270,750	305,500
Poland	106,112	77,450	53,555	120,000	90,250	93,000
Portugal (including overseas possessions) (5)	54,778	24,350	24,566	50,000	28,500	25,000
Union of Soviet Socialist Republics	79,425	122,242	198,436	230,000	160,075	161,000
Jugoslavia				12,500 (a)		
Total Quota Countries	3,446,083	3,121,216	3,333,990	3,760,000	3,230,950	3,270,000

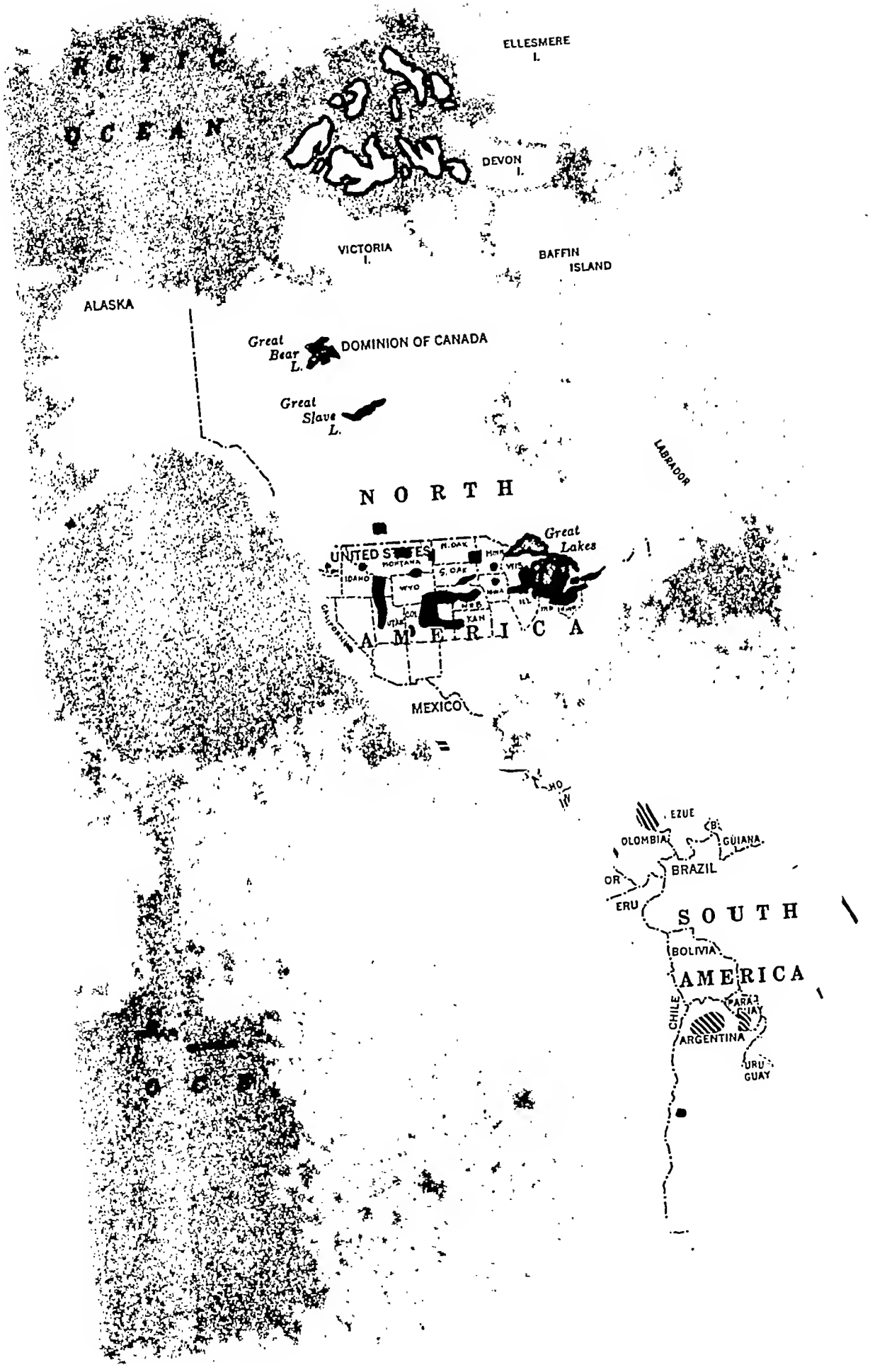
* Including an extra allotment of 90,000 metric tons for 1937-38 only, provided for in Article 19 of the agreement. (a) Reserve. (1) Up to August 31, 1937, Belgium only. (2) Calendar year exports 1935 and 1936, and September-August 1936-37. (3) Up to August 31, 1937, exports relate to the Netherlands East Indies only. (4) Calendar year, 1935. (5) Up to August 31, 1937, exports from Mozambique to foreign countries. (6) These exports cannot be regarded as normal because, although the sugar was produced in 1937, the validity of the export certificates for 300,000 metric tons, which would have expired on December 31, 1937, has been extended to August 31, 1938.

that voluntary surrenders of a further 228,375 tons had been promised bringing the total quotas down to 3,270,000 tons. The announcement further stated that demand had been estimated at 3,000,000 tons, that further war purchases by the British Government had been estimated at 150,000 tons, and that 100,000 tons of the quotas, it was estimated, would not be used. Thus a balance had been obtained, at least on paper, between estimated requirements and apparent supplies.

Future of the Agreement

It seems almost certain that world consumption will show a gradual improvement over the next few years. This should mean that the countries which have so valiantly made the sacrifice at this time will again be able to ship their full allotment and more. It is hoped also that these increased shipments will bring a price which should repay the signatory countries for the bread which they have just cast upon the waters.

Appended to this article is a table containing official figures of the International Sugar Council. They tell the story better than any words could. It is interesting to note that demand over the past few seasons, as shown by exports of signatory countries, has been fairly constant. It can also be clearly seen that very few important exporting countries are not members of the agreement. It has recently been proposed that invitations be extended to a number of smaller countries to join the group. This latest display of cooperation among the signatory nations should be a powerful argument to induce recalcitrant countries to sign on the dotted line. During, before, and after the last two meetings of the Council, there has been constant discussion in trade circles regarding an amendment to the agreement which would permit more flexible quotas, removing the five per cent limitation which is now in force for the first two years of the pact. However, if the adjustments made at the July meeting are sufficient to balance supply with demand and produce a price improvement, the troubles of the Council are, for the most part, over. During the last three years of the agreement there are no limitations on quota adjustments, although a unanimous vote of all exporting countries is necessary for a change. The crucial period will, therefore, be between now and next May when quotas for the third year will assume greater importance marketwise than the quotas for this year of the agreement which ends on August 31. It seems clear from the action taken at the July meeting that all signatory nations recognize the necessity of working in full harmony and there is no reason to expect that next year conditions will be any different.


ELLESMERE I.
DEVON I.
VICTORIA I.
BAFFIN ISLAND
ALASKA
Great Bear L.
DOMINION OF CANADA
Great Slave L.
LABRADOR
NORTH
UNITED STATES
Great Lakes
MEXICO
SOUTH
AMERICA
BRAZIL
BOLIVIA
CHILE
ARGENTINA


ARCTIC OCEAN
SIBERIA
NOVAZEMBLA
RUSSIA
ASIA
MANCHURIA
MONGOLIA
Sea of Japan
Aral Sea
TURKESTAN
SINKIANG
CHINESE REPUBLIC
CHINA
TIBET
PACIFIC OCEAN
TURKEY
ARMENIA
SYRIA
IRAQ
IRAN
AFGHANISTAN
INDIA
NEPAL
BHUTAN
ARABIA
BURMA
FRENCH INDO-CHINA
SIAM
FORMOSA
PHILIPPINE I.
EGYPT
ANGLO-EGYPTIAN SUDAN
ASIR
YEMEN
ADEN
OMAN
Arabian Sea
Bay of Bengal
CEYLON
CHINA SEA
EAST INDIES
STRAITS SETTLEMENTS
BORNEO
SUMATRA
NEW GUINEA
Coral Sea
ABYSSINIA
ERITREA
BELGIAN CONGO
UGANDA
KENYA
TANGANYIKA
ANGOLA
RHODESIA
AFRICA
TRANSVAAL
PORTUGUESE AFRICA
SOUTH AFRICA
MADAGASCAR
INDIAN OCEAN
AUSTRALIA
WESTERN AUSTRALIA
NORTHERN TERRITORY
QUEENSLAND
SOUTH AUSTRALIA
NEW SOUTH WALES
BEET
CANE
ARCTIC OCEAN

The United States Sugar Industry

THE BEGINNINGS of the sugar industry in the United States antedate the republic. Its development to its present proportions, however, has taken place principally within the last half-century. The only branch of the industry which had attained anything like its present magnitude before the Civil War was the production of cane sugar in Louisiana, where sugar cane had been grown since the middle of the eighteenth century.

The first sugar manufactured in what is now the United States was maple sugar. The early New England settlers learned its manufacture from the Indians. The sugar cane was unknown in America until it was introduced by the Spaniards in Santo Domingo. With the rise of sugar culture in the West Indies, an industry in the refining of imported raw sugar came into existence during the eighteenth century in the British colonies along the Atlantic seaboard, at New York and elsewhere. This was the beginning of the cane refining industry. Attempts at the production of beet sugar were made as early as 1838, but the beet industry did not become important until the eighteen nineties. The development of these different divisions of the sugar industry is discussed further in the sections devoted to beet sugar, cane sugar refining, and the sugar industry in Louisiana and Florida.

Consumption

American sugar consumption was small in the first part of the nineteenth century. Not until 1826 did it amount to as much as 50,000 short tons annually, and 1827 was the first year in which it reached ten pounds per capita. By 1834, consumption had risen to 104,000 tons, or 14.5 pounds per capita, and in 1846 it amounted to 202,000 tons, or 19.7 pounds per capita. Thereafter, the increase was more rapid. In 1861, the first year of the Civil War, consumption was 550,000 tons, or 34.3 pounds per capita. During the war consumption declined, falling to 296,000 tons in 1863, but by 1869 it had advanced to a new high point of 608,000 tons. The first year in which consumption reached a million tons was 1880, when it was 42.7 pounds per capita. Two million tons was reached in 1891, three million in 1904, and in 1913 consumption totalled 4,192,000 tons (85.4 pounds per capita). The years of restriction and high prices during and after the World War checked the rising trend, but in 1922 consumption jumped more than a million tons to 5,704,000 (103.2 pounds per capita). The maximum consumption so far recorded in one year was 6,508,000 tons in 1929 (108 pounds per capita). From 1929 to 1934 consumption declined, falling in the latter year to 5,940,000 tons, but in 1935 there was an increase to 6,247,000 tons, or 98 pounds per capita. Consumption in 1937 was 6,280,954 short tons, or 97.28 pounds per capita, refined value.

Imports

Imports of sugar in the first fiscal year of the republic, 1790, amounted to 9,114 short tons. In 1795 they had increased to 31,891 tons. From 1800 to 1850, imports fluctuated from year to year, rising to 93,236 tons in 1805 and falling to 22,521 tons in 1815. The average was under 50,000 tons per year. In 1850, imports reached 109,220 tons, and in 1860 they were 347,440, while in 1870 they were 598,415 tons. The first year in which imports amounted to a million tons was 1883 (1,068,834). Three million tons were imported for the first time in 1912 (including sugar from the insular territories and possessions). After the World War, from 1919 on, imports steadily increased until in 1929 they reached a peak of 6,278,208 tons. From this high point they fell to 4,653,981 tons in 1933. The marketing quotas established under the Jones-Costigan act in 1934 and the Sugar Act of 1937 have operated to stabilize imports at approximately 4,700,000 tons annually.

Until the middle eighteen fifties, consumption demand in the United States was supplied in about equal proportions by domestic production (chiefly Louisiana) and sugar refined from imported raws. From 1855 onward, the proportion of the supply derived from imports rose, and this trend was accelerated during the Civil War, when sugar production in the South was reduced almost to the point of extinction. From 1864 to 1875, more than 90 per cent of the supply was of foreign origin, and from 1880 to 1900 more than 80 per cent was similarly derived. Beet sugar first appeared as a source of supply to the amount of one per cent or more in 1894.

A new classification of sources of supply for the continental United States was introduced with the annexation in 1898-99 of Hawaii, Puerto Rico, and the Philippine Islands, whose product formerly had been classed as foreign. Hawaiian sugar had enjoyed free entry into the United States since 1876, under a treaty of reciprocity. Puerto Rican and Philippine sugars were at first given preferential tariff treatment, but within a few years they were also admitted free. In 1903, a reciprocity treaty was made with Cuba, granting a 20 per cent tariff preference to Cuban sugar.

Cuban Sugar

The result of these changes was greatly to reduce imports from other countries, whose sugar enjoyed no preference, and to encourage production in the new insular possessions and in Cuba. Imports from non-preferential foreign countries decreased from 1,435,000 tons in 1901 to 112,000 tons in 1913, and thereafter no longer constituted an important item in the United States supply. From 1904 to 1913, the proportion of the annual supply furnished by Cuba increased from 40.85 to 53.19 per cent; in the same period, insular sugar increased from 16.98 to 23.57 per cent, and domestic beet from 6.15 to 16.70 per cent, while domestic (Louisiana) cane sugar declined from 11.70 to 5.55 per cent, and full duty foreign sugar from 23.33 to 0.47 per cent.

These proportions held approximately the same during the following ten years. Cuba furnished, on average, 49 per cent of the annual supply; the insular territories about

26 per cent; beet sugar 18.5 per cent; and Louisiana a little more than 5 per cent. From 1922 through 1929, however, Cuba's share increased to more than 50 per cent, at the expense of other sources of supply. In 1930 the Hawley-Smoot tariff bill was enacted; this increased the rates of duty on imported sugars, including Cuban. Although Cuba retained the 20 per cent preference, the effect of the act was to reduce Cuba's share in the United States market, and increase that of insular and domestic beet sugar.

Quotas

Under the Jones-Costigan act and the Sugar Act of 1937, supplies for the continental United States, beginning in 1934, have been prorated among the different producing areas on the basis of their average production, or shipments to the United States, in preceding "representative years." As allocated for 1938, the quotas fixed under this act gave Cuba approximately 28.6 per cent of the total supply for the year; the insular territories, 26.1 per cent; the Philippines, 15.4 per cent; domestic beet, 23.2 per cent, and continental cane sugar (Louisiana and Florida), 6.3 per cent.

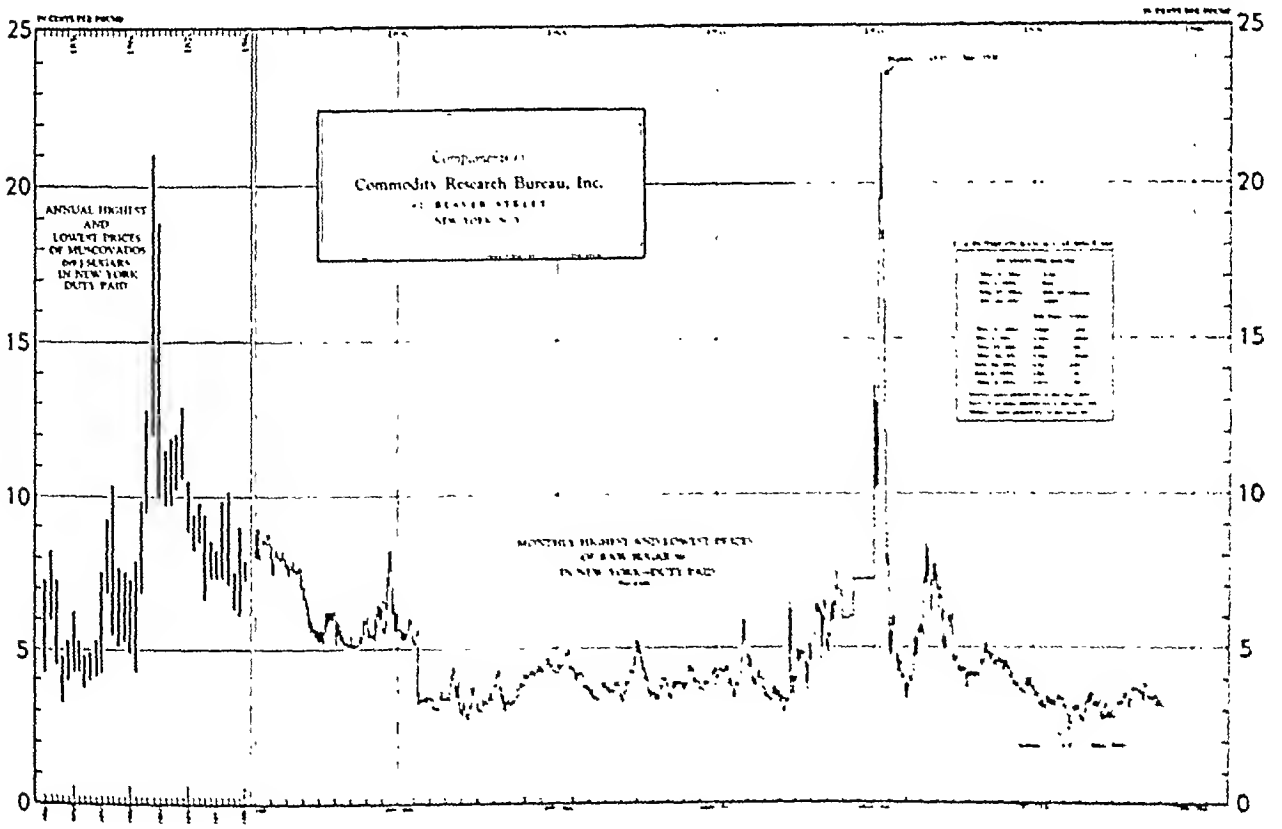
Exports

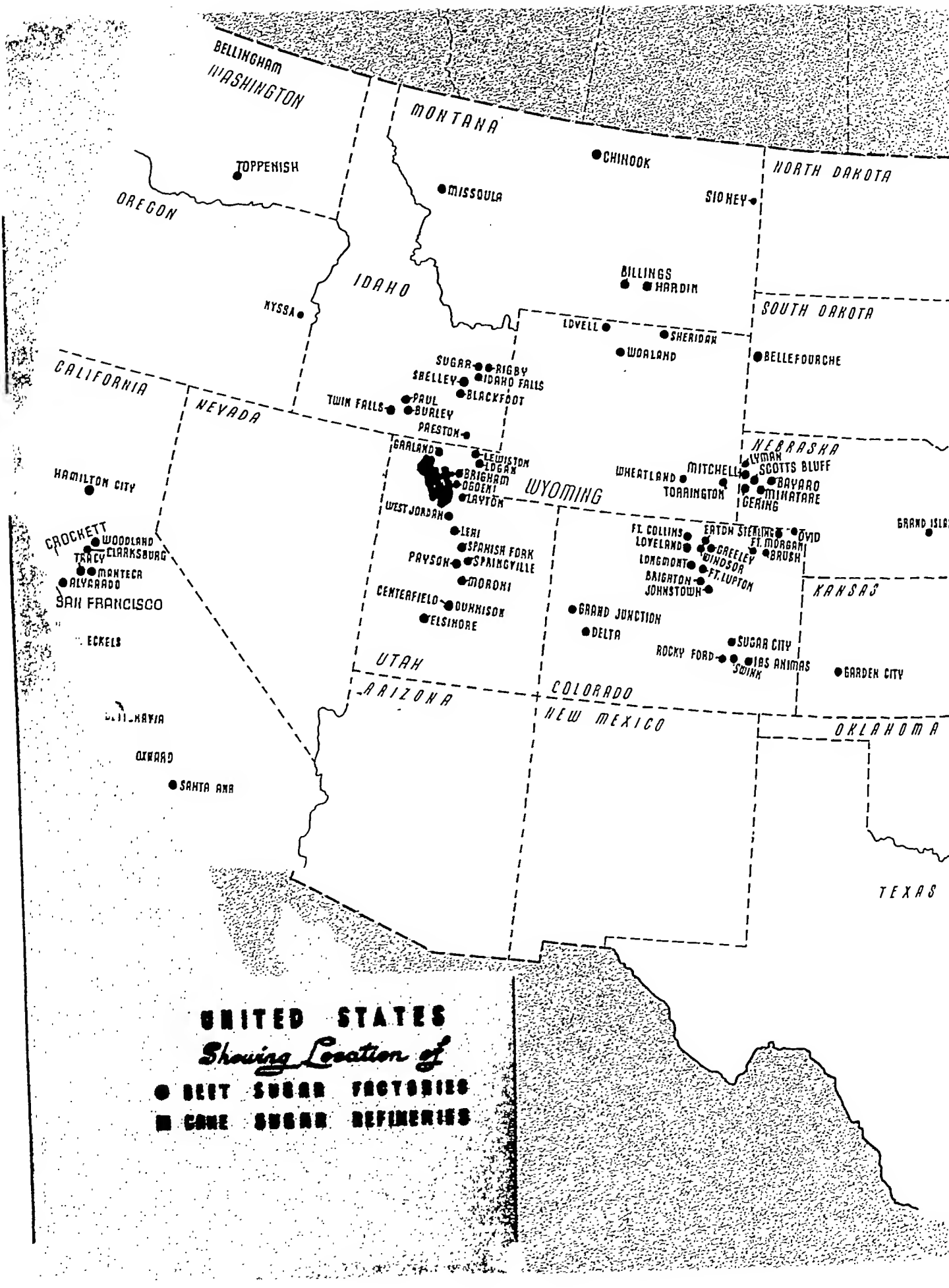
Exports of sugar from the United States began with the modest quantity of 25 tons in 1790, but in 1805 they reached 61,600 tons, declining to 1,603 tons in 1815. The United States being a larger consumer than producer, the export trade has consisted in the exportation of refined sugar made from imported raws, and has varied greatly from time to time, with the fluctuations of demand and prices in the world markets. From 1820 to 1875, exports were small, ranging between 4,000 and 23,000 tons annually. In 1885 they reached 129,000 tons, a figure not equalled until the World War years, but in 1893 they were only 9,707 tons. During the next two decades they varied from 5,372 tons in 1896, to 94,652 tons in 1904. The World War brought a sudden rise in exports, which in the (fiscal) year 1916 reached 788,326 tons. Reduced by war-time restrictions in 1917-18, they rose again to 737,704 tons in 1919, and reached a peak of 918,361 tons in 1922. By 1932 they had declined again to 49,004 tons, but increased to 136,408 tons in 1934, 113,956 tons in 1935, 60,281 tons in 1936, and in 1937 were 70,191 tons.

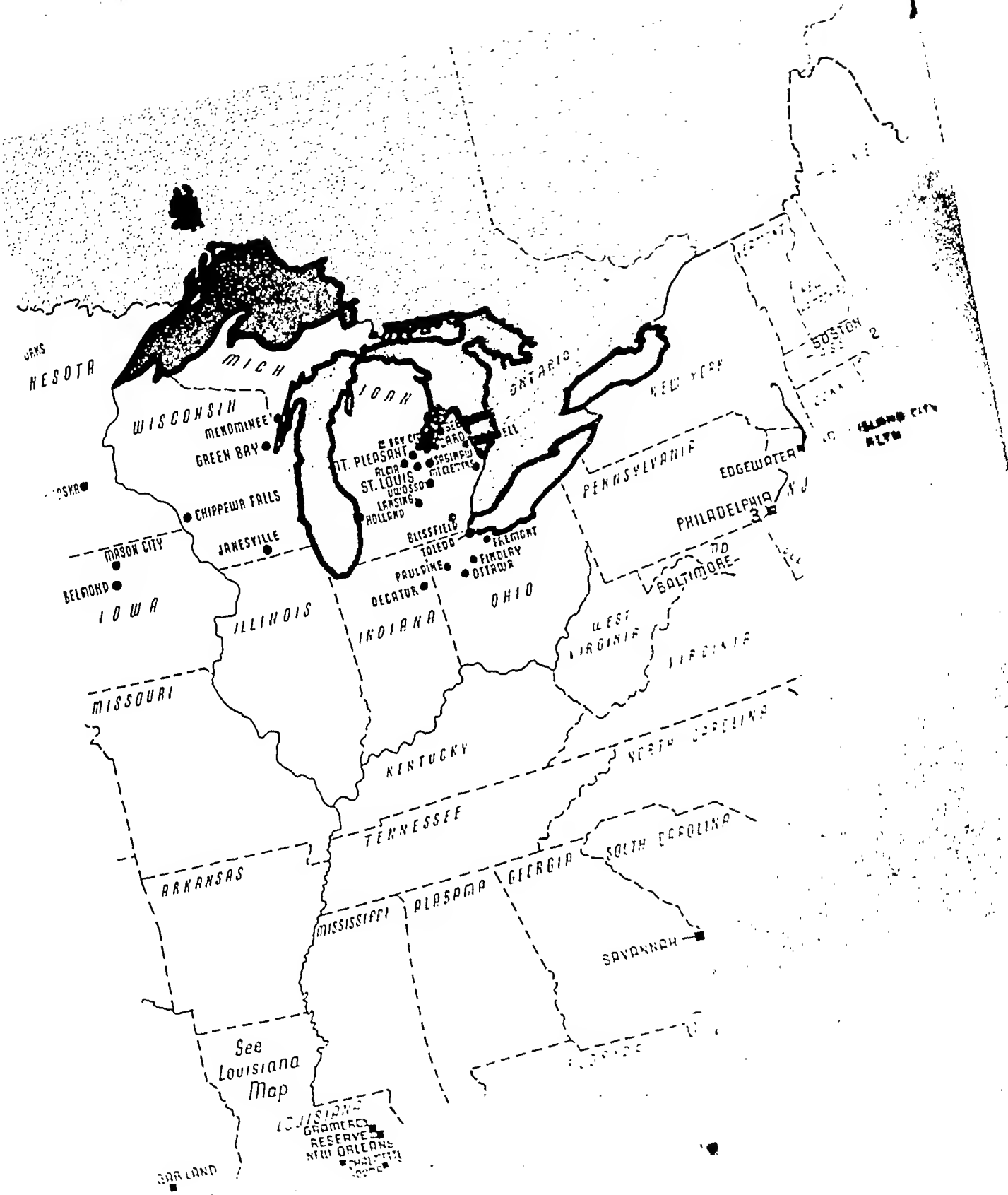
The Jones-Costigan Act

IN 1933 the United States established the Agricultural Adjustment Administration as a part of a program for improving the economic position of agriculture. The act establishing the A. A. A. included provisions for the payment of benefits to farm producers who entered into contracts to regulate their production of certain basic commodities. In 1934, Congress passed an amendment, known as the Jones-Costigan Act, which added sugar beets and cane and their products to the list of commodities subject to regulation. This act conferred upon the Secretary of Agriculture, as head of the A. A. A., authority to regulate the production and importation of sugar in the continental United States by fixing marketing quotas for

RAW SUGAR PRICES IN NEW YORK SINCE 1845




BELLINGHAM
WASHINGTON
MONTANA
NORTH DAKOTA
TOPPENISH
CHINOOK
MISSOULA
SIDNEY
OREGON
IDAHO
BILLINGS
HARDIN
NYSSA
SOUTH DAKOTA
LOVELL
SHERIDAN
WORLAND
BELLEFOURCHE
SUGAR
RIGBY
SHELLEY
IDAHO FALLS
BLACKFOOT
CALIFORNIA
NEVADA
TWIN FALLS
PAUL
BURLEY
PRESTON
GARLAND
LEWISTON
IDEAL
BRIGHAM
OGDEN
LAYTON
NEBRASKA
LYMAN
SCOTTS BLUFF
WHEATLAND
MITCHELL
BAYARD
TORRINGTON
MINATARE
GERING
HAMILTON CITY
WYOMING
WEST JORDAN
LEHI
SPANISH FORK
SPRINGVILLE
PAYSON
MORONI
CROCKETT
WOODLAND
CLARKSBURG
TRACY
MANTECA
ALVARADO
SAN FRANCISCO
CENTERFIELD
GUNNISON
ELSINORE
FT. COLLINS
EATON
STERLING
OVID
LOVELAND
GREELEY
FT. MORGAN
BRUSH
WINDSOR
LONGMONT
FT. LUPTON
BRIGHTON
JOHNSTOWN
KANSAS
GRAND JUNCTION
DELTA
ECKELS
SUGAR CITY
ROCKY FORD
LAS ANIMAS
SWINK
GARDEN CITY
UTAH
ARIZONA
COLORADO
NEW MEXICO
OKLAHOMA
OAKLAND
SANTA ANA
TEXAS
UNITED STATES
Showing Location of
BEET SUGAR FACTORIES
CANE SUGAR REFINERIES


MICHIGAN
WISCONSIN
MENOMINEE
GREEN BAY
CHIPPEWA FALLS
MASON CITY
JANESVILLE
BELMOND
IOWA
ILLINOIS
MISSOURI
ARKANSAS
MISSISSIPPI
LOUISIANA
GRAMERCY
RESERVE
NEW ORLEANS
BATON ROUGE
ST. PLEASANT
ALMA
ST. LOUIS
OSSINEKE
GLADSTONE
OSCODA
LANSING
HOLLAND
BLISSFIELD
TOLEDO
FREMONT
FINDLAY
OTTAWA
PAULDING
DECATUR
INDIANA
OHIO
KENTUCKY
TENNESSEE
ONTARIO
NEW YORK
PENNSYLVANIA
EDGEWATER
PHILADELPHIA
BALTIMORE
WEST VIRGINIA
VIRGINIA
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
SAVANNAH
BOSTON
See Louisiana Map

the different producing areas supplying the market. It also provided for processing taxes on sugar beets and cane, the proceeds from which were used to make benefit payments to beet and cane growers who entered into production adjustment contracts with the Agricultural Adjustment Administration. The purpose of these benefit payments was to bring farm returns from sugar crops up to approximately the average price level obtaining in 1926, in return for agreement by the producers to adjust their acreages to the quotas set up. Benefit payments were extended to producers in the insular possessions, as well as in the continental United States.

On January 6, 1936, the Agricultural Adjustment Act was declared unconstitutional by the Supreme Court of the United States. The decision put an end to processing taxes, and to production adjustment contracts in agriculture. It did not pass upon the legality of the Jones-Costigan Act, authorizing the establishment of marketing quotas for sugar. The government, therefore, took the position that this act, and the quota system, continued in effect. With the object of further strengthening this position, and removing the quotas from possible question on constitutional grounds, Congress passed (June, 1936) a joint resolution confirming the authority of the Secretary of Agriculture to establish quotas and make allotments.

The Sugar Act of 1937

In 1937 a new act, designated the Sugar Act of 1937, was passed by Congress. This act, which became effective September 1, 1937, superseded previous legislation. It continued the quota system, under the Secretary of Agriculture as administrative officer, and restored the processing tax and the system of benefit payments to sugar beet and cane producers. The act is to be in effect until December 31, 1940. A summary of its provisions is given elsewhere in this volume.

The marketing quotas for beet and cane sugar produced in the continental United States were fixed in the Jones-Costigan act at 1,550,000 short tons, raw value, for beet sugar, and 260,000 tons for cane sugar. Quotas for Hawaii, Puerto Rico, the Philippines and Virgin Islands, for Cuba, and for other foreign countries, were computed by the Secretary of Agriculture on the basis of their shipments to the United States during the most representative three years of the period 1925-1933. The total quota for each year was based upon the estimated sugar requirements of the country for the year. A Sugar Section was established in the Agricultural Adjustment Administration to administer the details of the sugar control.

The Sugar Act of 1937 provides that the total annual quota shall be allotted, 55.59 per cent to domestic producing areas (including the insular territories) and 44.41 per cent to foreign producing areas, including Cuba and the Philippine Islands. Percentage standards are also fixed, governing the subdivision of allotments among the various areas, and fixed quotas are established for the portions of each area's entire quota which may be imported into the continental United States in direct consumption form.

The annual quotas for the several producing areas since the system was established in 1934 have been as follows, in short tons, raw sugar value:

	1934	1935	1936 Initial	1936 Final
Beet Sugar	1,550,000	1,550,000	1,550,000	1,342,179*
Continental Cane	260,000	260,000	260,000	388,738
Hawaii	948,264	925,968	941,199	1,059,294
Puerto Rico	807,312	788,331	801,297	901,839
Philippine Islands	1,005,602	981,958	998,110	1,000,829
Virgin Islands	5,304	5,179	5,264	5,926
Cuba	1,866,482	1,822,596	1,852,575	2,085,022
Full Duty Foreign	25,836	25,228	25,643	28,860
Total	6,468,800	6,359,260	6,434,088	6,812,687

* Deficiency of 207,821 tons reallocated to other areas.

	1937 Initial	1937 Final	1938 Initial	1938 Revised
Beet Sugar	1,613,576	1,417,009*	1,591,390	1,572,559
Continental Cane	270,664	472,337	431,415	426,310
Hawaii	976,685	984,210	963,149	951,753
Puerto Rico	831,508	897,063	819,344	809,649
Philippine Islands	1,035,742	998,499*	1,057,416	991,020†
Virgin Islands	5,462	10,023	9,155	9,046
Cuba	1,922,423	2,148,951	1,962,771	1,939,546
Full Duty Foreign	26,610	114,641	27,121	80,683
Total	6,682,670	7,042,733	6,861,721	6,780,566

* Deficiency reallocated to other areas. Philippine deficiency of 53,883 tons reallocated to foreign countries other than Cuba.

† The revision of the 1938 quota, reducing the total by 81,195 tons, and the reallocation of the Philippine quota deficiency were made by the Secretary of Agriculture on June 10, 1938.

The quotas regulating the quantities of refined or other direct consumption sugar entering the United States (included within the total quotas above) have been as follows, in short tons, raw value:

	1934	1935	1936	1937	1938
Cuba	418,385	408,545	448,657	422,933	375,000
Hawaii	26,023	29,111	29,616	29,616	29,616
Puerto Rico	113,119	113,119	126,033	126,033	126,033
Philippines	79,661	79,661	80,214	80,214	80,214
Total	637,188	630,436	684,520	658,796	610,863

The direct consumption quotas, as previously stated, are now fixed by the terms of the Sugar Act of 1937, and will be the same in 1939 and 1940 as in 1938.

Quotas on the importation of syrup and liquid sugar were also established by the Sugar Act of 1937, as follows: Cuba, 7,970,558 wine gallons of 72 per cent total sugar content; Dominican Republic, 830,894 wine gallons. No other countries receive quotas for these products.

Beet Sugar Industry

THE beet sugar industry, which now supplies far the greater part of the sugar produced in the continental United States, is of much more recent origin than the cane industry. In America, as a commercially successful proposition, it dates only from 1879, although attempts at its establishment were made as early as 1838, when a sugar factory was built at Northampton, Massachusetts, by David Lee Child. This factory ceased operation after 1840.

In 1852, Brigham Young, the head of the Mormon Church, had sugar machinery imported from England and hauled overland by ox train from St. Louis to Utah. A factory was built at Salt Lake City and operated for three years, but only syrup was produced. Until a few years ago, the factory building still stood in the "Sugar House Ward" of Salt Lake City.

Alvarado Factory

Other attempts to establish sugar beet culture and the manufacture of beet sugar were made in different parts of the United States between 1856 and 1870. In the latter year, E. H. Dyer and others built a factory at Alvarado, California, and operated it for four years. The company found itself in financial difficulties and the factory was sold. Mr. Dyer did not lose interest, however, and in 1879 he bought the buildings and land of the former company at Alvarado, installed new machinery, and made a fresh start. This was the first successful beet sugar factory in the United States. Under various changes of ownership, it has continued in operation, with occasional interruptions, ever since 1879. It is now owned by the Holly Sugar Corporation, which has reconstructed and greatly enlarged it.

Effects of Tariffs

After Alvarado, no more factories were built until 1888, but with the enactment in 1890 of the McKinley tariff bill, which granted a bounty of two cents a pound on sugar of domestic production, the industry began to grow vigorously. A factory was built in Nebraska in 1890, and in 1891 three were erected, in Nebraska, Utah, and California. This made the total number of factories six. The repeal of the sugar bounty in 1894 halted development temporarily, but progress was resumed in 1896, when one more factory was built, followed by three in 1897, seven in 1898, and fourteen in 1899. In the campaign of 1900-01 there were 29 factories working, and sugar production totalled 86,082 short tons.

More and more factories were erected during the ensuing ten years, and in 1909-10, production reached 504,000 tons for the first time. By 1913-14 it had increased to 733,000 tons. The adoption of the Underwood tariff act, which reduced import duties, then brought another temporary check to construction. However, sugar demand suddenly rose as a result of the World War. By 1921 the number of factories in the United States had increased to 106, and in the campaign of 1920-21 the production of beet sugar exceeded a million tons for the first time. Since 1927, production has been in excess of a million tons annually, with peak productions of 1,352,000 tons in 1932 and 1,635,000 tons in 1933.

UNITED STATES BEET SUGAR FACTORIES

Amalgamated Sugar Company. Executive office: First National Bank Building, Ogden, Utah. Capital outstanding: 36,870 shares preferred, $100 par; 724,624 shares common, no par.

Stephen L. Richards.....Chairman of the Board
M. S. Eccles.....President
H. A. Benning.....Vice-President and General Manager
G. B. Rodman.....Vice-President in Charge of Sales
J. R. Bachman.....Secretary and Treasurer
A. J. Forbess.....General Engineer
R. H. Cottrell.....General Superintendent
A. L. Stark.....Auditor
J. W. Randall.....Manager, Utah District
R. H. Tallman.....Manager, Idaho District

Factories	Erected	Daily Capacity (Tons of Beets)	Manager
Ogden, Utah	1893	1,700	
*Logan, Utah	1901	850	
Lewiston, Utah	1905	1,600	
Burley, Idaho	1912	1,250	
Twin Falls, Idaho	1916	1,830	Harry A. Elcock
Rupert, Idaho	1917	1,385	Harry A. Elcock
Nyssa, Oregon	1938	2,000	
		10,615	

*Partially dismantled.

American Crystal Sugar Company. Executive office: Boston Building, Denver, Colorado. Capital outstanding: 43,500 shares preferred, $100 par; 364,017 shares common, no par.

C. K. Boettcher.....Chairman of the Board
W. N. Wilds.....President and Vice-Chairman of the Board
H. E. Zitkowski.....Vice-President and General Manager
J. B. Grant.....Vice-President and General Counsel
W. E. Kraybill.....Secretary and Treasurer
R. M. White.....General Engineer
C. T. Lund.....Chief Agriculturist

Factories	Erected	Daily Capacity (Tons of Beets)	Manager
Clarksburg, Cal.	1935	1,700	L. J. Holmes
Oxnard, Cal.	1898	3,600	J. W. Rooney
Rocky Ford, Colo.	1900	2,500	F. J. Kaspar
*Las Animas, Colo.	1907	800	F. J. Kaspar
Missoula, Mont.	1927	1,300	M. B. Wilson
Grand Island, Neb.	1890	800	A. J. Denman
Mason City, Iowa	1917	1,800	E. C. Moore
*Belmond, Iowa	1920	1,000	E. C. Moore
Chaska, Minn.	1906	1,540	P. T. Robinson
East Grand Forks, Minn.	1926	1,800	J. B. Bingham
*Chippewa Falls, Wisc.	1904	600	P. T. Robinson
		17,440	

*Idle 1937.

Central Sugar Company, Inc., Executive office: Utility Building, Ft. Wayne, Indiana. General office: Decatur, Indiana.

D. W. McMillen.....Chairman of the Board
Roy Hall.....President
J. W. Calland.....Vice-President and Agricultural Superintendent
H. W. McMillen.....Secretary-Treasurer
H. A. Maddox.....Assistant Secretary-Treasurer

Factory	Erected	Daily Capacity (Tons of Beets)	Manager
Decatur, Ind.	1912	1,300	H. W. McMillen

Franklin County Sugar Company. Executive Office, Colorado Springs, Colorado. Capital $1,000,000.

L. G. Carlton.....President
V. H. Mann.....Vice-President
Merrill E. Shoup.....Secretary
W. D. Wade.....Treasurer
Thomas Heath.....Manager and Superintendent
A. C. Hull.....Agricultural Superintendent

Factory	Erected	Daily Capacity (Tons of Beets)	Manager
Preston, Idaho	1922	1,440	Thomas Heath

Garden City Company. Executive Office, Broadmoor Hotel, Colorado Springs, Colorado. Capital, 39,177 shares, no par value.

Spencer Penrose.....President, Colorado Springs
J. Stewart.....Vice-President, Garden City
Charles L. Tutt.....Vice-President, Colorado Springs
W. E. Leavitt.....Treasurer, Garden City
M. W. Bozart.....Secretary, Colorado Springs
E. Stoeckly.....Superintendent, Garden City
W. B. Benson.....Traffic Manager, Garden City
Fred G. Holmes.....Manager Land Department, Garden City

Factory	Erected	Daily Capacity (Tons of Beets)	Factory Superintendent
Garden City, Kansas	1906	1,200	E. Stoeckly

Great Lakes Sugar Company. Executive Office, 624 Stormfeltz-Loveley Building, Detroit, Mich.

James E. Larrowe.....President
A. W. Beebe.....Vice-President and Treasurer
Searle Mowat.....Secretary
W. F. Schmitt.....General Manager
E. E. Stiff.....General Superintendent

Factories	Erected	Daily Capacity (Tons of Beets)
Fremont, Ohio	1900	950
Blissfield, Michigan	1905	1,340
Findlay, Ohio	1911	1,250
		3,540

Great Western Sugar Company. Executive Office, Sugar Building, Denver, Colorado. Capital $30,000,000.

W. L. Petrikin.....Chairman of the Board
F. A. Kemp.....President and General Manager
Charles Boettcher.....Vice-President
M. D. Thatcher.....Treasurer, Pueblo, Colorado
H. J. Miller.....Purchasing Manager
Joseph Maudru.....General Superintendent
H. F. Lambert.....Traffic Manager
W. L. Baker.....Sales Manager
N. R. McCreery.....Manager, Colorado District
D. J. Roach.....Manager, Nebraska District

Factories	Erected	Daily Capacity (Tons of Beets)	Manager
Loveland, Colo.	1901	3,100	J. L. Williams
Greeley, Colo.	1902	1,600	C. E. Evans
Eaton, Colo.	1902	1,600	C. E. Evans
Fort Collins, Colo.	1903	3,100	J. R. Mason
Windsor, Colo.	1903	1,600	John Comer
Longmont, Colo.	1903	3,100	F. A. Wilson
Sterling, Colo.	1905	1,600	M. S. Clement
Brush, Colo.	1906	1,600	H. C. Giese
Ft. Morgan, Colo.	1906	1,600	H. C. Giese
Billings, Mont.	1906	3,500	C. W. Doherty
Scottsbluff, Neb.	1910	2,900	D. J. Roach
Lovell, Wyo.	1916	1,200	H. S. Looper
Gering, Neb.	1916	1,700	D. J. Roach
Bayard, Neb.	1917	1,800	A. M. Ginn
Brighton, Colo.	1917	1,800	C. F. Johnson
Mitchell, Neb.	1920	1,800	C. S. Campbell
Ft. Lupton, Colo.	1920	1,200	C. F. Johnson
Ovid, Colo.	1926	1,900	P. H. McMaster
Minatare, Neb.	1926	1,800	A. M. Ginn
Lyman, Neb.	1927	2,000	L. H. Andrews
Wheatland, Wyo.	1930	1,500	Frank Whiting
		42,000	

Molasses Refinery	Erected	Manager
Johnstown, Colo.	1926	C. C. Crawford

Gunnison Sugar Company. Executive Office, First National Bank Building, Salt Lake City, Utah. Capital authorized $1,075,000, outstanding $600,000.

R. T. Harris.....President
W. J. Wintch.....Vice-President
T. W. Harris.....Secretary and Treasurer

Factory	Erected	Daily Capacity (Tons of Beets)	Factory Superintendent
Centerfield, Utah	1918	1,100	Hart J. Sanders

Holly Sugar Corporation. Executive Office, Golden Cycle Building, Colorado Springs, Colo. Capital outstanding—$3,180,000 preferred; 100,000 common shares.

Wiley Blair, Jr.....President
G. W. Repetti.....Executive Vice-President
W. L. Lawson.....Vice-President
W. D. Hemming.....Vice-President
W. M. Trant.....Secretary
E. P. Shove.....Treasurer
G. L. Ammon.....Sales Manager
G. M. Drummond.....General Superintendent, Colorado District
C. D. Adams.....General Superintendent, Wyoming-Montana District
G. J. Daley.....General Superintendent, California District
R. J. Smith.....General Chemist
A. L. Cooper.....Chief Engineer

Factories	Erected	Daily Capacity (Tons of Beets)	Manager
Alvarado, Calif.	1879	1,400	W. H. Zierler
*Grand Junction, Colo.	1899	1,100	N. W. Draper
Swink, Colo.	1906	2,500	T. E. Gardiner
Hamilton City, Calif.	1906	1,200	J. A. Ratekin
Santa Ana, Calif.	1912	1,250	G. J. Strodthoff
Sheridan, Wyo.	1915	1,200	C. D. Adams
Worland, Wyo.	1917	1,200	L. E. Laird
Tracy, Calif.	1917	1,400	W. H. Zierler
Delta, Colo.	1920	1,250	N. W. Draper
Sidney, Mont.	1925	1,500	C. D. Adams
Torrington, Wyo.	1926	2,800	T. E. Carlsen
Hardin, Mont.	1937	1,500	
		18,300	

*Idle, 1937.

Superior Sugar Refining Company. Executive Office, Menominee, Michigan.

A. C. Wells ..... President
G. W. McCormick ..... Vice-President
A. A. Henes ..... Treasurer
H. W. Blunden ..... Secretary
August Ludwig ..... Manager and Superintendent

Factory	Erected	Daily Capacity (Tons of Beets)
Menominee, Mich.	1903	1,300

Toledo Sugar Company. Executive Office, Saginaw, Michigan. Capital stock issued, $458,900.

E. C. Bostock ..... President and General Manager
R. J. Baird ..... Treasurer
A. C. Eberlein ..... Assistant Secretary

Factory	Erected	Daily Capacity (Tons of Beets)
Toledo, Ohio (Closed)	1912	1,800

Union Sugar Company. Executive Office, 260 Califonia Street, San Francisco, California. Authorized capital, $5,000,000.

Edmunds Lyman ..... President
Joseph Friedlander ..... First Vice-President
F. O. Cooke ..... Second Vice-President
E. I. Holmes ..... Secretary and Treasurer
B. M. Martin ..... Assistant Secretary and Treasurer

Factory	Erected	Daily Capacity (Tons of Beets)	Manager
Betteravia, Cal.	1899	1,500	E. F. Ogboro

Utah-Idaho Sugar Company. Executive Office, Salt Lake City, Utah. Issued Capital, $17,238,000.

Heber J. Grant ..... President
Reed Smoot ..... Vice-President
Fred G. Taylor ..... Acting General Manager
W. T. Pyper ..... Secretary
W. Bert Robinson ..... Treasurer
W. Y. Cannon ..... General Superintendent
F. W. McEntyre ..... Chief Engineer
H. W. Ansell ..... Traffic Manager
J. W. Timpson ..... Sales Manager
D. H. Thomas ..... Purchasing Agent
Douglas Scalley ..... General Agricultural Superintendent

Factories	Erected	Daily Capacity (Tons of Beets)	Superiotendeot
*Lehi, Utah	1891	1,300	
Garland, Utah	1903	1,600	J. M. Gaddie
Idaho Falls, Idaho	1904	1,600	Leoo Taylor
Sugar City, Idaho	1904	1,600	J. R. Paterson
Blackfoot, Idaho	1904	1,225	William Varley
*Elsinore, Utah	1911	900	
*Payson, Utah	1913	875	
Spanish Fork, Utah	1916	1,625	C. M. Jacobseo
West Jordan, Utah	1916	1,200	
Brigham City, Utah	1916	1,300	A. C. Pearson
*Springville, Utah	1918	450	
Shelley, Idaho	1917	1,150	C. B. Halliday
*Rigby, Idaho	1919	800	
Belliogham, Wash.	1925	1,200	R. L. Howard
Chinook, Montaoa	1925	1,200	Hatler Gearheart
Belle Fourche, S. D.	1927	1,550	W. J. O'Bryaot
Toppeoish, Wash.	1937	1,500	C. M. Middletoo
		20,275	

*Idle, 1937.

Waverly Sugar Company. Executive Office, Waverly, Iowa. Capital, $300,000.

Factory	Erected	Daily Capacity (Tons of Beets)
Waverly, Iowa (Idle, 1937)	1907	500

West Bay City Sugar Company. Executive Office, Bay City, W. S. Michigan. Capital and Surplus, $1,400,000.

M. J. Bialy ..... President, Treasurer, and General Manager
Earl C. Kelton ..... Vice-President
A. D. Bialy ..... Secretary and Purchasing Agent

Factory	Daily Capacity (Tons of Beets)	Factory Superintendent
*West Bay City, Mich.	900	E. C. Kelton

*Did not operate in 1937.

BEET SUGAR PRODUCTION BY STATES, 1933-1937

(Compiled by United States Beet Sugar Association. Figures in Bags of 100 Pounds)

State	1933–34	1934–35	1935–36	1936–37	1937–38
Colorado	7,965,508	5,429,438	5,897,018	6,696,188	6,055,912
California	5,418,712	5,417,244	4,776,092	6,201,616	5,689,549
Montana	2,471,366	1,988,838	1,675,256	1,827,505	2,431,080
Nebraska	2,590,742	1,440,530	1,908,225	2,107,298	2,258,368
Idaho	2,614,685	916,988	1,439,248	1,827,581	2,000,559
Wyoming	2,083,985	1,742,606	1,852,807	1,673,215	1,874,786
Utah	2,861,082	785,707	1,527,893	1,398,642	1,622,234
Michigan	3,404,397	2,954,736	1,949,895	2,328,597	1,581,944
Minnesota	945,172	493,362	666,747	462,082	739,942
Washington	119,939	64,467	96,178	108,046	287,366
Ohio	766,360	698,733	647,778	555,795	273,057
Iowa	501,911	325,828	290,152	257,594	254,251
Indiana	199,394	213,768	222,000	211,901	186,762
Wisconsin	333,190	278,148	181,435	162,493	153,894
Kansas	278,231	169,501	109,406	157,602	152,777
South Dakota	272,016	249,716	338,549	125,273	134,794
Total, bags	32,826,690	23,169,610	23,578,679	26,101,428	25,697,275
Total, short tons	1,641,335	1,158,480	1,178,934	1,305,071	1,284,864
Total short tons, raw value	1,756,228	1,239,574	1,261,459	1,396,426	1,374,804

Cane Sugar Industry

SUGAR CANE has been cultivated in Louisiana since 1751, when the plant was introduced from Hispaniola by the Jesuits. The manufacture of sugar, as a commercial proposition, however, was first established in 1795 by Etienne de Bore. Previously, only rum had been manufactured from the cane. Bore's success led to the speedy erection of other sugar mills, and the industry grew rapidly, especially after the introduction in 1820 of better varieties of canes, subsequently known as the Louisiana Purple and Louisiana Striped. These canes originally had been brought from Java to the West Indies by the Dutch, and about 1814 were introduced into Georgia, where their success led Louisiana planters to adopt them.

The Nineteenth Century

The eighteen twenties also saw the first use of the steam engine to operate the mills in which the cane was crushed. Down to the Civil War, the industry was carried on with slave labor, on large plantations, each plantation having its own sugar mill. In 1853, when production under these conditions reached its highest point, there were more than 1,500 plantations in operation and the sugar production amounted to 228,000 short tons. The Civil War virtually wiped the industry out of existence; in 1865, production in Louisiana had fallen to 5,331 tons. By 1875, however, it had increased again to more than 80,000 tons, and in 1880 it reached 136,000 tons.

Although by this time the trend had set in toward separation of cane growing from sugar manufacture, with the subdivision of the large plantations into smaller units operated by tenants, whose cane was ground in central factories, these factories were small in size and large in number. In 1880, for example, there were still 1,144 cane sugar factories in Louisiana and the other Southern states, whose average sugar output was only a little more than 100 tons to the factory. Some of these plants were operated by animal power, and the open kettle method of manufacture was in general use, being only gradually displaced by the introduction of the vacuum pan.

A more rapid growth of the industry began in 1890, accompanied by accentuation of the trend toward concentration in large central mills. By 1911, when production had risen to 353,000 short tons, the number of factories had decreased to 187. The period from 1900 to 1911 marked the highest development of production, and was followed by the second of the two major crises through which the industry has passed, the first being the Civil War. The second resulted from the gradual failure of the Purple and Striped varieties of cane so long grown, as a result of the increasing prevalence of diseases, notably the mosaic disease. This condition at first manifested itself gradually, but after 1921 production decreased rapidly, and in 1926 amounted to only 47,000 tons. From this low state the industry was rescued by the introduction for a second time of new canes originating in Java, in this case the P. O. J. varieties, which now, with other improved kinds, have almost entirely replaced those formerly grown. With these new varieties, production recovered rapidly and in 1937 reached 403,000 short tons, raw value, a record.

Florida Industry

Sugar cane is still grown in other southern states besides Louisiana, but sugar manufacture is no longer carried on in any of them except Florida, where the industry is of recent establishment. Cane has been grown in Florida from an early period, but the present industry in sugar manufacture dates from the opening to cultivation, by extensive drainage works, of the Everglades region in southern Florida, in the early nineteen twenties. Following this development, a sugar factory was built in 1923 at Canal Point. This factory has been idle for the past two seasons, but two others have been placed in operation since 1930, and sugar production has increased from about 26,000 tons in 1931-32 to 57,000 tons in 1937-38.

FLORIDA SUGAR FACTORIES

Factory	Location	Owner	Capacity Class Cane per 24 Hrs.
Clewiston	Clewiston	United States Sugar Corp.	4500
Fellsmere	Fellsmere	Fellsmere Sugar Co.	
*Canal Point	Azucar	United States Sugar Corp.	800

*Idle, 1938

LOUISIANA SUGAR PRODUCTION, 1894-1937

(Tons of 2,000 pounds)

Year	Tons	Year	Tons	Year	Tons	Year	Tons
1894	355,414	1905	377,162	1916	305,900	1927	70,792
1895	266,248	1906	257,600	1917	245,600	1928	132,055
1896	315,850	1907	380,800	1918	280,900	1929	102,600
1897	347,701	1908	597,600*	1919	121,000	1930	183,[illegible]
1898	278,497	1909	520,526	1920	169,127	1931	159,617
1899	159,583	1910	342,720	1921	324,451	1932	222,760
1900	308,648	1911	352,874	1922	295,095	1933	205,000
1901	360,277	1912	155,573	1923	162,023	1934	234,000
1902	368,734	1913	292,698	1924	88,485	1935	330,000
1903	255,894	1914	242,700	1925	139,581	1936	[illegible],540
1904	309,195	1915	137,500	1926	47,166†	1937	403,000

*Largest production previous to 1937. †Smallest crop since 1897.

LOUISIANA SYRUP AND MOLASSES PRODUCTION, 1918-1937

Year	Gallons Syrup	Gallons Molasses	Year	Gallons Syrup	Gallons Molasses
1918	10,793,000	28,049,000	1928	[illegible],847	18,834,5[illegible]
1919	3,672,000	12,991,000	1929	5,773,0[illegible]	19,[illegible],0[illegible]
1920	4,659,885	16,856,867	1930	[illegible],872	[illegible],[illegible]
1921	6,454,388	25,425,341	1931	4,544,[illegible]	14,444,[illegible]
1922	6,489,527	22,718,640	1932	[illegible],[illegible]	16,445,[illegible]
1923	6,718,420	15,719,425	1933	5,450,000	[illegible],[illegible]
1924	9,920,118	9,589,544	1934	[illegible],000	[illegible],[illegible]
1925	6,540,542	17,745,013	1935	[illegible],000	[illegible],000
1926	4,516,10[illegible]	6,614,435	1936	[illegible],000	[illegible],000
1927	4,786,90[illegible]	6,624,075	1937	[illegible],000	[illegible],000

LOUISIANA SYRUP FACTORIES

Factory	Location	Owner	Capacity Class Cane per 24 Hrs.
Bernard	New Iberia	A. M. Bernard Wagon Works, Inc.	250
Forest Home	Arnaudville	Estate Geo. L. Stafford	350
Golden Gate	Burnside	Chauvin Bros., Lessees	[illegible]
Jeffrey	Jeanerette	D. L. Jeffrey & Son	350
Mary	Lafayette	James T. Mary	150

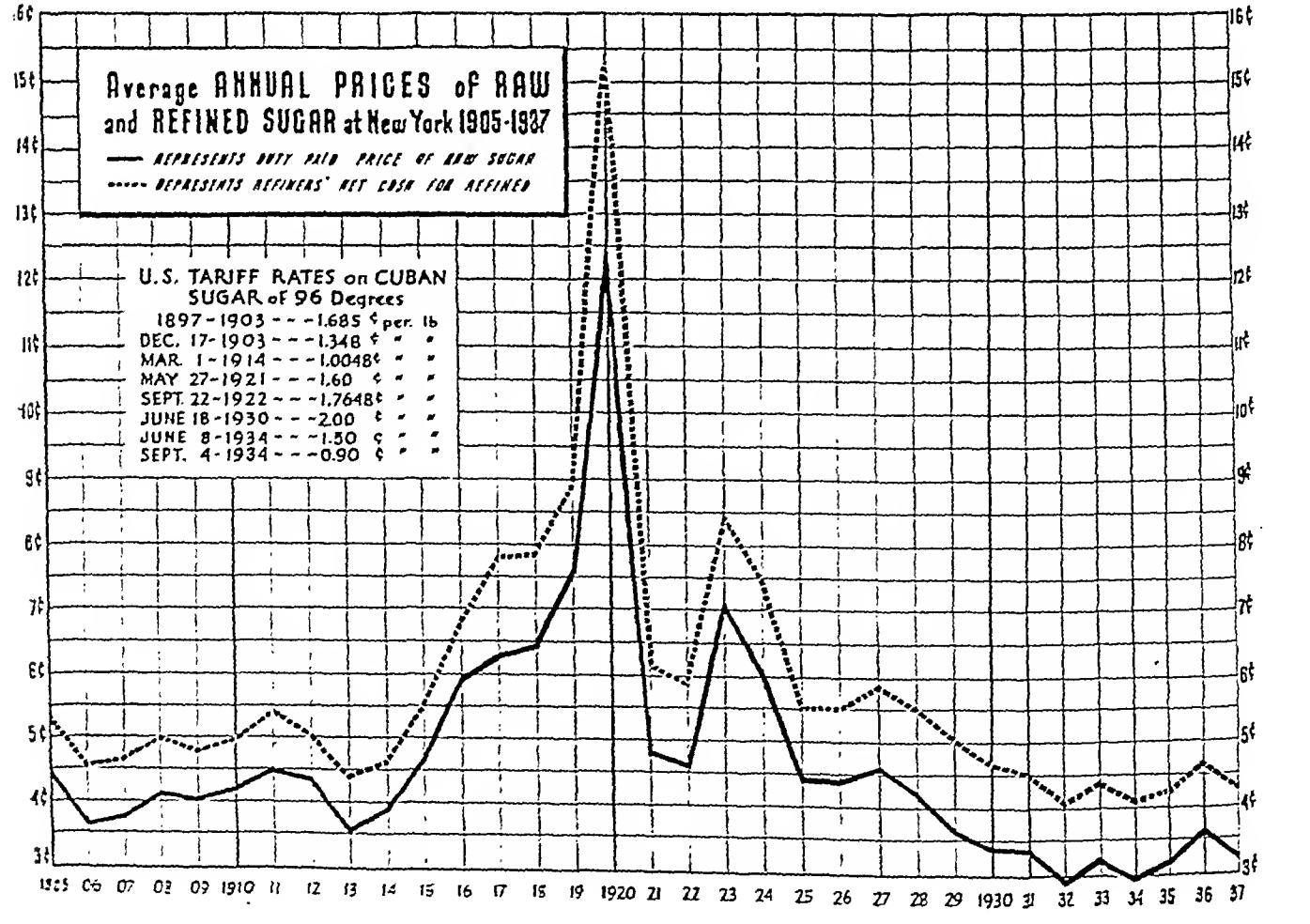

LOUISIANA
SUGAR FACTORIES

UNITED STATES SUGAR SUPPLY AND CONSUMPTION, 1825-1937

(Tons of 2,000 Pounds)

Year	Domestic Production	Refined from Imported Raws*	Imports†				Total Consumption	Consumption Per Capita (Lbs.)	Exports†
			Cuban	Insular	Other	Total			
1825	15,236	28,347	24,735‡		11,151	35,886	43,583	8.0	10,957
1830	38,440	39,637	31,458		11,787	43,245	78,077	12.1	5,675
1835	37,374	68,320	50,582		12,437	63,019	105,694	14.3	4,064
1840	57,743	62,296	50,380		10,090	60,470	120,039	14.1	15,229
1845	137,424	50,723	48,479		9,354	57,833	188,147	18.9	7,997
1850	125,201	142,937	100,277		8,943	109,220	268,138	23.1	8,699
1855	172,823	235,361	224,052		12,890	236,942	408,184	30.0	22,438
1860	135,346	344,893	311,597		35,843	347,440	480,239	30.5	19,238
1865	7,970	365,207	255,447	35,003	35,536	325,986	373,177	21.5	16,318
1870	70,784	609,990	418,736	102,048	77,631	598,415	680,774	35.3	11,380
1875	78,680	807,912	593,167	125,903	179,685	898,755	886,592	40.3	17,676
1880	169,948	901,650	561,170	139,243	214,233	914,646	1,071,598	42.7	20,320
1885	197,159	1,257,026	557,523	254,478	546,941	1,358,942	1,454,185	51.8	129,082
1890	245,375	1,408,167	520,538	280,580	665,888	1,467,006	1,653,542	52.8	23,748
1895	422,583	1,761,131	922,881	199,754	664,620	1,787,255	2,183,714	63.4	13,617
1900	302,213	2,184,016	352,728	313,381	1,342,934	2,009,043	2,486,229	65.2	13,459
1905	1,199,904§	1,748,178§	1,028,842‖	591,020	772,625	2,392,487	2,948,082	70.5	13,714
1910	1,817,290	1,935,108	1,754,829	927,752	204,509	2,887,090	3,752,398	81.6	94,652
1915	2,171,904	2,085,811	2,392,444	1,098,314	154,626	3,645,384	4,257,715	83.8	300,552
1920	1,564,588	3,010,245	2,881,076	1,121,996	996,732	4,999,804	4,574,833	86.5	462,096
1925	2,875,279	3,295,988	3,923,094	1,858,891	35,755	5,817,740	6,171,267	107.5	379,358
1926	2,621,087	3,730,808	4,279,892	1,692,958	45,924	6,018,774	6,351,895	109.3	106,896
1927	2,664,016	3,268,680	3,650,354	1,886,957	32,411	5,569,722	5,932,696	101.0	125,322
1928	3,254,387	2,953,365	3,249,474	1,974,899	36,962	4,261,335	6,207,752	104.3	125,092
1929	3,115,503	3,392,794	4,148,720	2,104,009	32,121	6,284,850	6,508,297	108.1	102,639
1930	3,490,029	2,781,273	2,642,563	2,474,525	56,701	5,173,789	6,271,302	99.4	77,814
1931	3,814,207	2,318,021	2,315,822	2,545,098	43,817	4,904,737	6,132,228	98.5	52,577
1932	4,167,630	1,672,005	1,904,378	2,960,115	23,862	4,888,355	5,839,636	93.3	49,004
1933	4,399,125	1,503,685	1,589,152	3,014,324	51,864	4,655,340	5,902,810	93.6	50,496
1934	4,334,504	1,416,411	1,858,161	2,838,034	30,625	4,726,820	5,750,915	90.7	136,408
1935	4,142,146	1,838,551	1,991,123	2,661,384	63,296	4,715,803	6,246,574	97.1	113,956
1936	4,336,281	1,843,811	1,909,467	2,737,071	85,056	4,731,594	6,316,549	98.37	61,716
1937	4,377,050	2,158,870	2,153,152	2,803,340	86,747	5,043,239	6,290,955	97.3	70,191

* Also includes foreign sugar for direct consumption. †Fiscal years to 1915; calendar years from 1920. ‡Imports from Cuba and Puerto Rico not separately reported until 1860. § Sugar from insular possessions included as domestic after 1900. ‖ Cuban reciprocity treaty in effect, 1904.



The American Cane Sugar Refining Industry

Its Origins and Early Development and Effects of the Industrial Revolution

By David T. Ray

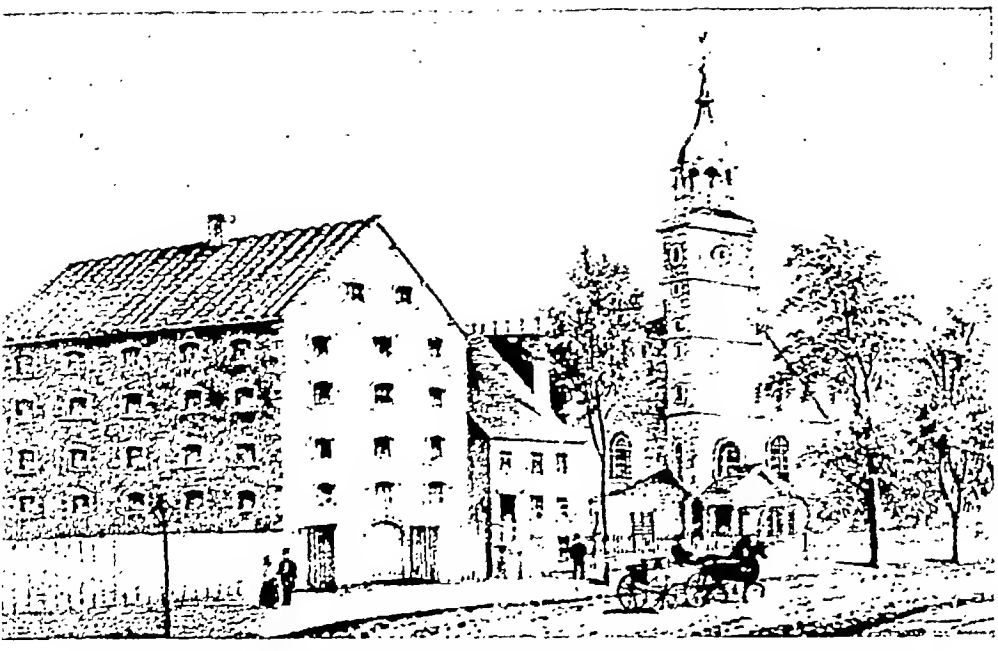
United States Cane Sugar Refiners' Association

BEHIND the pure white refined sugar which Americans accept casually as a familiar necessity, and consume in larger quantity than any other people, lies a long history. Even in America, sugar refining goes back to a time before the United States existed as a national entity; but before America was discovered by Europeans, a refining industry had been established in Venice in the fifteenth century. With the colonial expansion of the western European countries in the sixteenth and seventeenth centuries, and the development of sugar cane cultivation in Brazil and the West Indies, the seat of the refining industry shifted from Venice to Antwerp, Rotterdam, Paris, and London—the points of departure for the New World colonies which had become the chief sources of raw sugar supply.

The refined sugar produced in the sixteenth, seventeenth, and even the eighteenth centuries, however, was not refined sugar as it is known today. It was a loaf sugar, which was also sometimes sold in pulverized form, or a "sugar candy," like rock candy, obtained in large-crystalline form from a supersaturated solution. Its price was high, and refined sugar was a luxury to be enjoyed only by the wealthy. The greater part of the sugar consumed was in the raw form.

and almost inevitable step. The early records of this industry are obscure, but one writer, M. E. Booth, ascribes one of the early New York sugar houses to as early a date as 1689. It is probable that the refining of sugar, after a fashion, was conducted in seventeenth century New York as an incidental operation by so-called bake-shops before the first actual sugar refinery was established. In 1725 a monopoly of sugar refining was granted by the New York legislature to one Robert Hooper, but was forfeited a few years later for failure to comply with its provisions. The first definitely ascribable date to the existence of refining in the colonies is 1730. In 1731 an inquiry by the Board of Trade "with respect to laws made, manufactures set up, or trade carried on, detrimental to the trade, navigations, or manufactures of Great Britain," recorded that, "There are several still houses and sugar bakeries established in New England."

It appears probable that some of the eighteenth century refineries were operated by persons engaged in the West Indies Trade. In New York, some of the well-known families were engaged in the sugar business. One of the oldest "sugar houses" apparently was that of Samuel Bayard, on Wall street, between Nassau and William, which appears on New York City maps of 1728 and 1755. Nich-



The Old Sugar House and Middle Dutch Church in Liberty Street, New York, in 1830; from "Valentine's Manual", 1885.

the wall is a brick window with the original wrought iron bars taken from the Rhinelander sugar house at the time of its demolition in 1893. The sugar house was built in 1763 and served as a British prison during the Revolutionary War. Not far from here was the refinery of Isaac Roosevelt, great-great-grandfather of President Franklin D. Roosevelt. This sugar house stood on what was known as Skinner street, near the old tan yards, the present Cliff street. Two of the best known colonial sugar houses were the sugar house of Peter Livingston, erected in 1754 on the present site of 28-36 Liberty street, between William and Nassau, and the Van Cortlandt sugar house, which adjoined the northwest corner of Trinity churchyard. Both of these were used as British prisons during the Revolution. A contemporary of these was Griswold's sugar house, situated in the present Battery Park at the extreme southern tip of Manhattan. Three of these structures survived into the following century, the Livingston sugar house being demolished in 1840, the Van Cortlandt in 1852 and the Rhinelander sugar house not until 1893.

Other Refining Centres

Records of early refineries in other cities have not been preserved as well as in New York. Ezekiel Cheever, of Charlestown, Massachusetts, had a sugar house which was carried on the tax rolls from 1721 to 1766. His son, Ezekiel, is also on record as a "sugar baker." A census of the buildings in Boston in 1760 does not mention any sugar houses. Similarly, Philadelphia records do not mention any sugar houses earlier than 1783, in which year a refinery was erected on Vine street by Samuel Miles and Jacob Morgan. The next record of a refinery in Philadelphia is of one owned by the firm of Morgan, Douglas & Schaffer in 1797-98, on North Third street. This site subsequently was used for refining purposes for nearly a century, and a forerunner of the present Franklin Sugar Refinery had its first plant here, in 1864. In 1795, a petition to Congress by the Philadelphia sugar trade was signed by Muhlenberg & Lawerswyler, Cornman & Lawler, J. Bartholomew and J. Dorsey, and Peter & Henry Miercken.

A sugar house was built in Baltimore in 1784 by Garts and Leypold. Another Baltimore refiner, Samuel Smith, is quoted in the Philadelphia refiners' petition of 1795.

Early Sugar Prices

Down to the end of the eighteenth century, however, refined sugar was still a luxury product, to be found only on the tables of gentlemen and wealthy public servants. Wooley in his *Journal,* of 1678 mentions, "sugar in Barbadoes, twelve shillings the hundred, which contains 112 pounds, which at New York yields 30 shillings the bare hundred." Presumably the shilling had a much higher purchasing power in those early days, for if converted at the present par rate, this gives a price of only 7 cents a pound for muscovado sugar in New York. This was cheap, compared to some prices recorded in documents of the eighteenth century; for example, Benjamin Franklin's account book, under date of November 28, 1746, contains an entry of £5-10-3 for a barrel of 87 pounds, which is equivalent to 30 cents a pound at present day values. Prices in 1750, as recorded in the New York *Gazette* for August 6 (quoted in Valentine's Manual) were 18d. a pound for "single refined," equal to 36½ cents present value; 50-55s. for muscovado (per hundredweight), equal to 11-12 cents per pound; and 1s. 9d. per gallon for molasses. Prices apparently were lower in the seventeen sixties: George Washington's ledger records for August 4, 1762, the purchase of 234 pounds for £6 7s., or the equivalent of 12 cents a pound, but the account book of Thomas Hazard shows a price of 16s. "old tenor" in 1766, which would be equal to about 16½ cents a pound in present day money. It should be noted that in the majority of cases old account entries rarely specified the type and grade of sugar purchased, and inferences have to be made from the present prices themselves.

Sugar Becomes a Political Issue

Sugar as a political issue in the colonial era first appears with the Sugar Act of 1764, enacted by the British Parliament in response to nearly thirty years of agitation by the British West Indian planters, who complained that the tax policies of the home government made it impossible for them to compete with the cheaper sugar produced by the French and Spanish islands. The solution adopted by Parliament, however, was not to reduce the taxes, but to enforce the Navigation Acts, adopted in Cromwell's time,

which had been allowed to become largely a dead letter. These regulations required the carriage of all colonial goods in British ships to the home country prior to re-export, and sought to prevent direct trade with the Spanish and French colonies. The effect of these laws, if enforced, would have been to make sugar, and other tropical products, dearer in the North American colonies; the result was the springing up of a widespread "traffick by connivance" between the mainland colonies and the West Indies, and the aggravation of the dissensions between the mainland colonies and the mother country which eventuated in the War of Independence.

By the end of the eighteenth century the refining industry had been established for nearly a century in the former colonies constituting the young United States, and there were refineries in all of the leading seaports—Boston, Providence, New York, Philadelphia, and Baltimore. Fuller records of the sugar trade were also now provided by the United States customs records of imports and exports, and the excise tax on refined sugar. In 1795, the year when the Philadelphia refiners addressed their petition to Congress in the matter of taxes, the three leading states in the order of output were Pennsylvania, New York, and Massachusetts. In this petition mention is made of seventeen sugar refineries; on the basis of a total refined production in that year of 1,092,000 pounds, the yearly capacity of the average sugar house would appear to have been around 32 tons. That both the number and the average capacity thus indicated are probably too small may be surmised from the fact that only five years later there were seven refineries in Boston alone. In 1810, the first United States census of manufactures reported 33 refineries, producing 7,867,211 pounds of sugar, or an average of 119 tons each.

Consumption in 1795

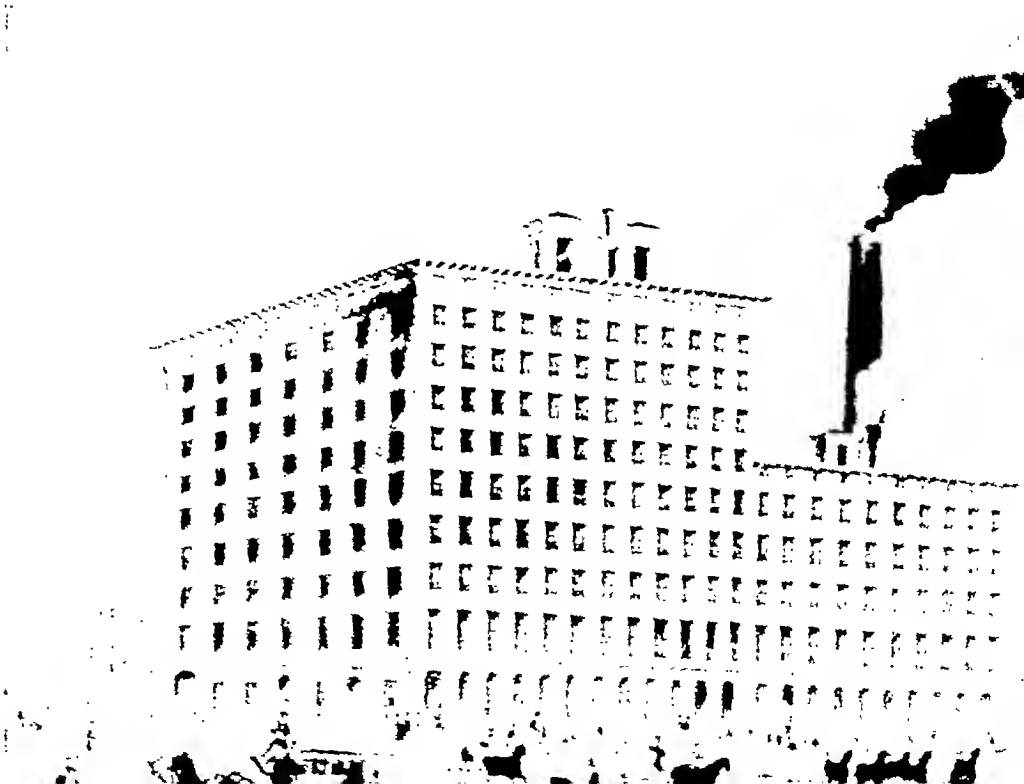
The records further show that the country then consumed only slightly more than two-thirds of the sugar imported, and there was a considerable re-export trade, chiefly to Europe. The bulk of the sugar consumed was still in the crude form known as brown sugar, but this is not to be confused with the brown sugar — a fully refined product — produced by modern refineries. It was more like the sugar which is still largely consumed by the people of tropical countries, and which, when intended primarily for direct consumption, was and is called "muscovado." The development of the refiner's art had reached such a point that it took only two pounds of raw sugar to make a pound of refined, whence it may be concluded that about 2,184,000 pounds of the West Indies brown sugar imported went into refining, or 5.5 per cent of the total quantity (34,203,000 pounds) retained for consumption. Refined loaf sugar was still such an expensive delicacy that less than half a pound was consumed annually per capita.

Sugar Refining in 1795

Data on the technique of refining in this pre-industrial era are plentiful. The refineries were generally structures of five or six stories, in accordance with the accepted practice that pumping or lifting the sugar solutions should be eliminated as much as possible. The first operation, therefore, commenced on the highest floor, and the last was conducted on the ground floor. The location of the "stewbes," or kettles, was planned so as to utilize the varying degrees of heat available at different points between the furnace fire-box and the chimney draft. Large, round copper kettles were used, as much as four feet in diameter and 2½ feet deep. A later development was the use of a large but very shallow kettle, to promote quick heating and allow the boiling syrup to be stirred readily.

Clarification was effected by heating together equal quantities of raw sugar and lime water. The resulting solution was heated to boiling, and the brownish scum which rose to the surface was repeatedly skimmed off. Then the skimmed solution was sometimes strained through a blanket or cloth, and a coagulant added. Ox blood, beaten to defibrinate it, was the coagulant most commonly used, and was known as "spice." Frequently, the ox blood was added to the raw sugar along with the lime water, at the first melting. White of egg was also commonly used as a substitute for ox blood.

The Steam Sugar Refinery of R. L. & A. Stuart at Greenwich, Chambers & Reade Streets, New York



The mixture of sugar and "spice" being further heated to boiling, the albumin of the blood rose and brought with it the brown coloring matter and the gums and other impurities in the raw sugar. This was skimmed off, and more "spice" added until the scum obtained was completely white. Then the clarified sugar was "skipped off" by a wooden channel into another vessel, which commonly was an oblong basket fixed on iron bars over a cistern, and containing a thick blanket which served as a filter.

The sugar syrup, after clarification, was transferred to a smaller pan, over a hotter fire, and was boiled down to the point which would give the best results in crystallization. This step of the process was an art. Insufficient evaporation would result in a low sugar recovery, and overboiling would produce a dense mass of crystals from which the molasses would not drain. Various tests were used to determine the proper point, such as ladling out a small portion to cool. If it congealed into a ball which would flatten slightly on the bottom, the "strike" could be made. Another test was to take a portion of the thickening syrup between the thumb and forefinger; if it was stringy, the right stage had been reached. The practiced boiler could tell whether the batch was done by observing the bubbles that welled up in the boiling mass.

The "Curing" Process

The next step was to pour the boiled-down massecuite into cooling cisterns, where the first crystals formed were stirred and beaten into the batch, to promote even graining. It was then ladled into moulds, which were conical earthenware vessels, each having a hole in the bottom for drainage, which was plugged when the vessel was filled. Each mould was set over another pot, and after a day or so the plugs were removed, when the excess molasses slowly dripped away from the crystals. This process, called "curing," required about two weeks to complete.

Some of the sugar loaves thus produced were melted down and refined again to produce the choice "double loaf" sugar. Others were "clayed," which meant simply securing the more complete removal of molasses from the sugar in the mould by covering the top of the loaf with a paste of moist clay. As the molasses dripped out, the moisture from the clay seeped into the loaf to replace it, and a white loaf was obtained. Moist cloths were sometimes laid on top of the mould instead of clay. Finally, the loaves were knocked from the moulds and dried by baking for several days in large kilns heated by stoves. From this final step of the process, refiners were often called "sugar bakers."

The run-off syrups from the moulds, which were comparatively rich in sucrose, were boiled down further and yielded more sugar, known as "bastard sugar." Even the skimmings were worked over to give a modicum of product called "scum sugar." A final form of sugar, still sometimes seen today, was "sugar candy," produced by slow crystallization from a super-saturated solution in the mould.

Yields and Capital Requirements

As previously mentioned, about two pounds of raw sugar were required to make one pound of refined by the processes described. By 1831 the processes had been so far improved that, according to George Richardson Porter, the general average yield obtained from 112 pounds of raw sugar was 61 pounds of refined, 18 pounds of bastard sugar, 28 pounds of molasses, and 5 pounds of waste. The present accepted figure is 100 pounds of granulated sugar produced from 107 pounds of 96° raws. The fixed assets of a sugar house in 1795 required an investment of around $16,000, and in order to operate adequately a refiner required a capital of $50,000 and liberal credit. These figures are based upon data giving the total capital invested in the seventeen refineries existing in 1795 as $850,000, and the total fixed assets as $272,000.

Some further data on the economic aspects of the sugar industry in 1795 are afforded by figures which show that the country, with an estimated population of 4,619,000, consumed a total of 19,701 short tons of sugar, of which 18,609 tons were raw sugar directly consumed. This was equivalent to approximately 8½ pounds per capita. Prices were about 10 cents a pound for raw sugar, and 20 cents a pound for refined, so that the refiner's margin amounted to 10 cents.

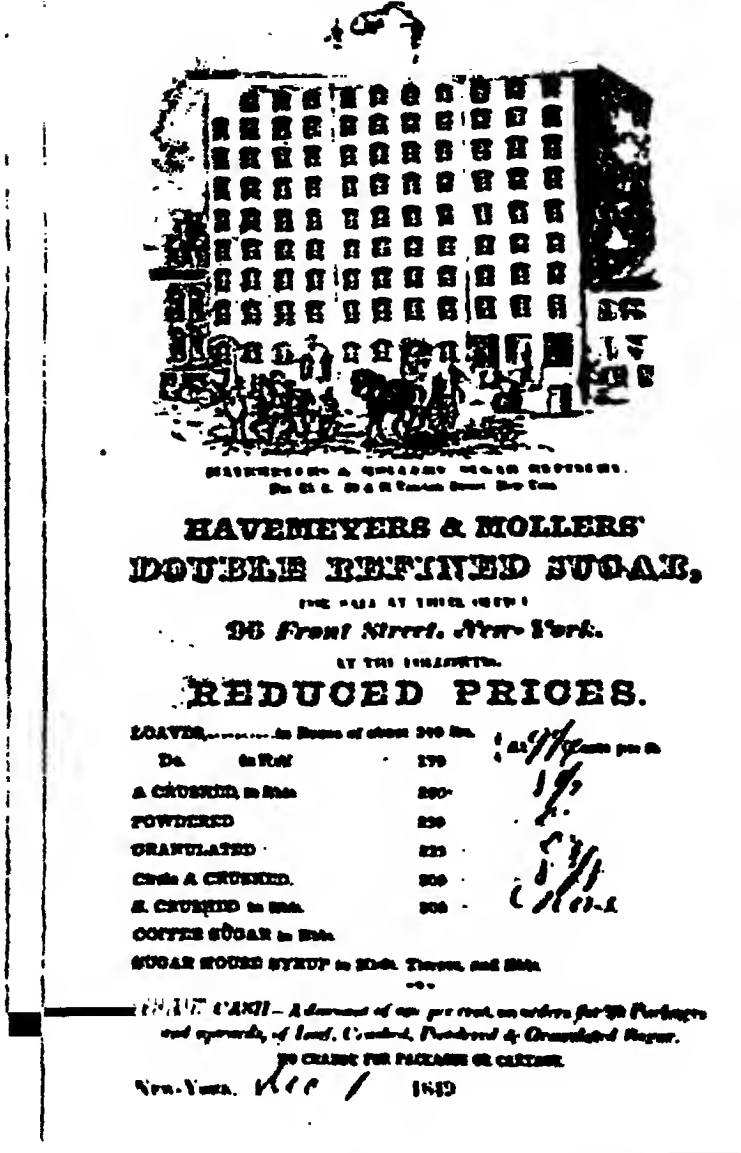
The loaf sugar which constituted the ordinary form of the refined product was not granulated, and was sold either in the loaf or pulverized. The loaves were truncated cones weighing 12 to 14 pounds. Loaf sugar was especially in favor for sweetening tea and coffee, being free from any molasses taste. Another use for it, on gala occasions, was to place a loaf in a punch bowl, pour rum over it, and ignite the rum. The burning rum caramelized some of the sugar, which in turn gave a distinctive and much appreciated flavor to the rum.

The Industrial Revolution

The conditions and methods which have been described as applying to the sugar industry at the beginning of the nineteenth century remained roughly applicable to it, although modified in details, down to the changes brought about by the new "industrial revolution," so-called, which in the United States took place, roughly speaking, between the late eighteen forties and the Civil War. As a result of the impact on the sugar refining industry of the "new age" of steam and steel, equipment adequate to handling a tremendously increased volume of product was used, and the consumer who had known refined sugar only as an expensive luxury became able to afford it for everyday use, and eventually to look upon it as a necessity. The changes in the refining industry did not take place in a day, nor was the sugar cheapened instantaneously, but viewed in the perspective of previous history the transformation appears sudden.

First came the new applications of steam, which made it possible to heat the melted raw sugar with steam coils, instead of in copper kettles over an open fire. This permitted economy in fuel, more effective control of temperature, and elimination of the danger of burning the "melt." Then came the adoption of the "blow-up pan," utilizing the idea (which Edward Charles Howard had patented as early as 1813) of blowing jets of steam through the dis-

Sales Announcement of Havemeyers & Mollers' Sugar Refinery, 1849. Showing the Refinery on Vandam Street. From "A Short History of Sugar," by Norris Havemeyer Mundy.



HAVEMEYERS & MOLLERS'

DOUBLE REFINED SUGAR,

96 *Front Street, New-York.*

REDUCED PRICES.

solving sugar. Meanwhile, also, steam was finding constantly greater application to pumping and conveying machinery, so that a larger and larger volume of raw sugar could be handled by a single refinery. Iron containers and piping, too, made their appearance with the steam age, and in the same year that the principle of the blow-up pan was devised (1813) Howard also patented the vacuum boiling principle. Accompanying these were improvements in clarification and filtration. The use of vegetable charcoal as a clarifier had been patented by A. M. Constant as early as 1812, and the properties of bone-char were known, although not extensively utilized, at this time. In 1825, Freund patented the use of fuller's earth and potash in the clarifying process. The old decomposable and messy "spice" began to fall into disuse in progressive sugar houses. In 1824, Cleland patented the bag filter.

Perhaps more revolutionary than any of these inventions, because it did away with the "curing" process and reduced from two or more weeks to a single day the time required to manufacture raw sugar into refined, was the invention of the centrifugal machine by Hardman in 1843. Formerly, the only end product of refining was a dense and nonuniform mass of crystals packed together in a loaf. This had to be pulverized, either by the local grocer, or the refiner himself to reduce it to a useable condition. With the invention of the granulating machine, about 1848, it was possible to dry loose crystals of any degree of fineness, after which they could be sifted, graded, or further pulverized. The granulator performed, in part, the function of the old sugar baker's stove.

It is not to be supposed that the adoption of these improvements was synonymous with their patenting. According to J. E. Searles, steam for heating purposes had not established itself generally until 1838, although the R. L. & A. Stuart steam sugar refinery in New York City was established in 1832, and one (burned in 1829) had been operated earlier by D. L. Thomas in Baltimore. The vacuum pan was not generally adopted until 1855. Similarly, although the clarifying properties of vegetable and animal charcoals had been known and found limited use forty years before, the charcoal filter in its modern form did not come into use until after 1855. The centrifugal machine did not inaugurate the new era of vastly increased capacity in refining until after 1860. All of these inventions had first to go through a process of improvement and perfection

the interior of a centrifugal basket containing many rectangular compartments. These are filled with the crystal magma, allowed to stand for 24 hours and spun, a pure sugar syrup being forced through the slabs while spinning. The slabs are then removed, dried, sawed into bars by high speed circular saws, and clipped into tablets or cubes by knives.

plaster of Paris in their sugar. An unmistakable characteristic, unique for each one of the sugars, is its behavior towards polarized light. The laws of optical rotation were formulated by Biot, and polariscopic analysis of sugars was employed by the United States government as early as 1847, but did not come into general industrial use until about 1870. Now, a number of other exact scientific methods have been adopted for control purposes. Measurements of pH, or degree of acidity, of specific gravity, glucose and molasses factors, saline and ash coefficients, and of the adsorption coefficient of clarifying carbons have replaced the sticky thumb and practiced eye of the old-time sugar boiler.

Economic Results

The first result of the technological revolution in the manufacture of raws and refining was a steady fall in the price of sugar, and a reduction of the difference in price between raw sugar and refined. From ten cents a pound in 1795, this difference was reduced to three cents a pound in a few years after the Civil War, while at the present time the complicated and mechanized operations of converting raw into refined sugar are performed at roughly one-third of the latter cost. As the price of refined sugar fell, making it available to more and more of the population, the refiner also was enabled to buy his raw material at lower prices, since the technological changes in refining were accompanied by similar improvements in the production of raw sugar.

Another effect of the industrial revolution and the general growth of the country was the extension of the refining industry beyond its original home on the Atlantic seaboard. In Louisiana, where the manufacture of raw sugar had been established since 1796, the refining industry was slow in developing. Although there were fifteen hundred sugar plantations in Louisiana in 1853, Champomier lists only four refineries in 1850-51, having a production of 3,754 short tons of sugar and 2,327 tons of "cistern sugar." There was also the Belcher Brothers' refinery in St. Louis, which produced 6,564 tons of sugar and 1,325 tons of "cistern sugar." In 1860, there were still only four refineries.

The Civil War almost annihilated the sugar industry in Louisiana, but within ten years after its close there had been established several large refineries into the design of which were incorporated all the improved methods then known. The Planters Sugar Refining Company built a refinery in New Orleans on Decatur street, in 1872, while George Eastwick built another refinery close by for the Louisiana Sugar Refining Company in 1883; both of these properties were acquired by the American Sugar Refining Company and continued in operation until 1909, when they were superseded by that company's huge Chalmette refinery. Henderson and Cogswell entered the refining industry in 1872, with a small unit. In 1893, the partnership of William Henderson and Adam Gambel was formed and a new refinery was constructed which commenced operations in 1896. The Godchaux family, which had been active in the production of raw and plantation sugars since 1868, converted their property at Reserve, Louisiana, into a refinery in 1918. The Sterling Sugar and Railway Company was organized in 1902, to be succeeded in 1921 by the present Sterling Sugars, Inc. The Gramercy refinery of the Colonial Sugars Company was built in 1901.

According to the census of 1870, there were then 59 refining establishments in the United States, employing 4,597 hands, producing 377,005 tons of refined sugar, and representing a capital investment of $20,545,220. The refining process by this time had advanced to a point where the amount of raw sugar required to make a pound of refined had been reduced to very nearly the present-day figure. In the period from 1870 to 1880, a number of very large plants were built, prices, both of raw and refined sugar, fell rapidly, and competition in the industry was very keen. The result was extensive consolidation, and the elimination of older and less efficient units. By 1875, according to John E. Searles of the American Sugar Refining Company, the number of refineries had fallen to 42. By 1880 there were only 27.

Coincident with the reduction in the number of refining plants, there took place an increase in their size and a concentration of the industry in its present areas: the North Atlantic seaboard, Louisiana, and the Pacific Coast. In the

Havemeyer, Townsend & Company's Refinery at South Third Street, Brooklyn, Built in 1859. This Was the First Refinery on the Site Now Occupied by the American Sugar Refining Company

period between 1850 and 1870, sugar was refined at one time or another in fourteen states, and in 1870 there were 33 refineries in New York and Pennsylvania alone. Now the industry is confined to nine states: Massachusetts, New York, New Jersey, Pennsylvania, Maryland, Georgia, Louisiana, Texas, and California.

The only important refining center not yet considered is the Pacific Coast. There was a small refinery in California, probably in San Francisco, as early as 1860. In 1867 Claus and Peter Spreckels, who had made a fortune in the Sandwich Islands in the production of raw sugar, built a refinery in San Francisco, owned and operated by their corporation, the California Sugar Refinery. In 1881, a third refinery was built in San Francisco, which also came under the control of the Spreckels interests. One of the Spreckels plants was destroyed in the Great Fire. The other is being operated by the Western Sugar Refinery, a department of the J. D. and A. B. Spreckels Company. In 1897 the California Beet Sugar and Refining Company began operations in California, contemplating not only the production of beet sugar, but also the refining of cane sugar. This company failed in 1903. The name was then changed to the California and Hawaiian Sugar Refining Corporation, Limited. This company purchased a flour mill at Crockett, California, and converted it into a small refinery in which operations were commenced in 1906. From this has grown the huge Crockett refinery, one of the largest, if not the largest, sugar refinery in the world.

The Era of Consolidation

The leader in the movement toward fewer and larger refining units was the A. & D. Havemeyer Company, established in New York in 1805 in a little building, with only four or five employees. The business grew, and in 1858 Frederick C. Havemeyer purchased a tract of land on the waterfront in Brooklyn, thereby initiating the movement which has resulted in all refineries of the present day having waterfront locations at which raw sugar cargoes can be unloaded directly. The firm of Havemeyers & Elder was formed in 1861, and by 1887 it was the largest refining company in the country. At this time, after long negotiations, control of twenty of the principal refineries was secured, and they were united in the Sugar Refineries Company, which in 1891 was reorganized and its holdings transferred to the newly formed American Sugar Refining Company. In the course of time, all of that company's refining operations were consolidated in a few large plants. At the present time the American Sugar Refining Company operates only five large refineries—in Boston, New York, Baltimore, Philadelphia, and at Chalmette, Louisiana. Of these, the Baltimore and Chalmette refineries were entirely new plants opened in 1922 and 1909, respectively, while the others have been extensively rebuilt and modernized in recent years.

Refining and the Tariff

A factor not to be overlooked in the economic evolution of the refining industry is the tariff. A tariff has existed on imported sugar, both raw and refined, since 1789, and it assumed a protective aspect as early as 1790, when refined (loaf) sugar was subjected to a duty of 5 cents a pound. This was raised to 9 cents in 1794, and later to 18 cents. After 1816, a succession of tariff reductions took place, and the duty was lowered to 12 cents, then to 10 cents, and in 1842 to 6 cents a pound. The rate of duty was changed to 30 per cent *ad valorem* in 1846, and this was later reduced to 24 per cent. The effect of this early protection was practically to give the whole American market to the American refiners. Their competition came, not from foreign refineries, but from brown sugar and molasses used extensively by the great mass of the population. Throughout this period the refiners were also benefited by drawbacks on re-exported refined sugar. Another source of profit, until 1842, was the importation of rich molasses, and later, liquid sugar, for refining, at a lower tariff rate. Although the tariff advantage was then abolished, the extraction of raw sugar from rich molasses continued in the United States pretty much throughout the nineteenth century. The Jacob Read smear house at Yonkers was built in 1870. The Oxnard Brothers and the McCahan refinery

The Havemeyers & Elder Refinery, South Third to South Fifth Streets, Brooklyn, About 1880

in Philadelphia extracted sugar from rich molasses. Indeed, the McCahan sugar house was not converted into a refinery properly speaking, until 1892-93.

Through buying high grade raws and even clayed sugars, and by improvement of the refining process, the refiners had reduced wastage to about three per cent by 1850. The destruction of the Louisiana industry by the Civil War gave a great impetus to the importation of raw sugar. The tariff on refined sugar was reduced to two cents a pound in 1861, just before the war broke out, but during the war was increased until in 1864 it became five cents. During the war, refined sugar also paid an excise tax of 1½ cents a pound, which cut heavily into the refiners' profits. This tax remained in effect until 1867. The import duty was reduced in 1870 to 4 cents a pound, and in 1883 to 3½ cents.

Reviewing the forces at work in the industry prior to the era of consolidations in the 1880s, Paul L. Vogt, in "The Sugar Refining Industry in the United States," finds that: " . . it may be said that from the earliest times to the Civil War the tariff was a very important factor; that during the Civil War this influence, while doubtless real, is merged with a number of other causes, such as the destruction of the Louisiana sugar industry, the stimulus of increased prices, and the influence of the drawback. . . . It seems, too, that neither the tariff nor the panic of 1873 had any great direct effect in hastening the failures of refining companies during the seventies. The tariff of 1883 may have hastened the final combination. The effect of the tariff was the indirect one of being a factor stimulating the industry to the point of overproduction during the years preceding 1870."

The Revolution in Distribution

Somewhat later than the industrial revolution, there took place another series of changes, often referred to as the revolution in distribution. This was a natural consequence of the tremendous increase of production made possible by machinery and applied science. Progress in distribution may be divided into shipping improvements, and marketing improvements. With the exception of automobile trucking, the physical movement of goods had almost reached its present state of development by 1900.

Modern packaging, grading, and advertising, however, has arisen practically since the turn of the century. No more than fifty years ago, food staples such as meat, milk, flour, sugar, etc., were prepared and sold in bulk. From the ten gallon can, barrel, sack or side delivered to him, the retailer parceled out to the customer. Few consumers knew the name of the manufacturer, and none knew the exact grade of the product he was purchasing. Standardization of quality, exact grading, and guarantee as to purity did not exist.

The sugar refining industry was one of the first major food industries to adopt the modern technique of distribution, although not until long after refining had become a mass production industry. Packaging entered the sugar industry, curiously enough, via tobacco and coffee. An automatic weighing device had been patented in 1879 and was used by a Philadelphia tobacconist. In 1880, Henry E. Smyser patented a package making and filling machine. Both of these patents were bought in 1891 by Arbuckle Brothers, then engaged primarily in the coffee business, and interested in preserving for their customers the advantages of a method devised by them for glazing freshly roasted coffee beans. Shortly after adopting a machine-made package for their coffee, Arbuckles conceived the idea of packaging sugar with the same machine. The use of labels printed on a three-color press was another pioneer step taken by the Arbuckle firm.

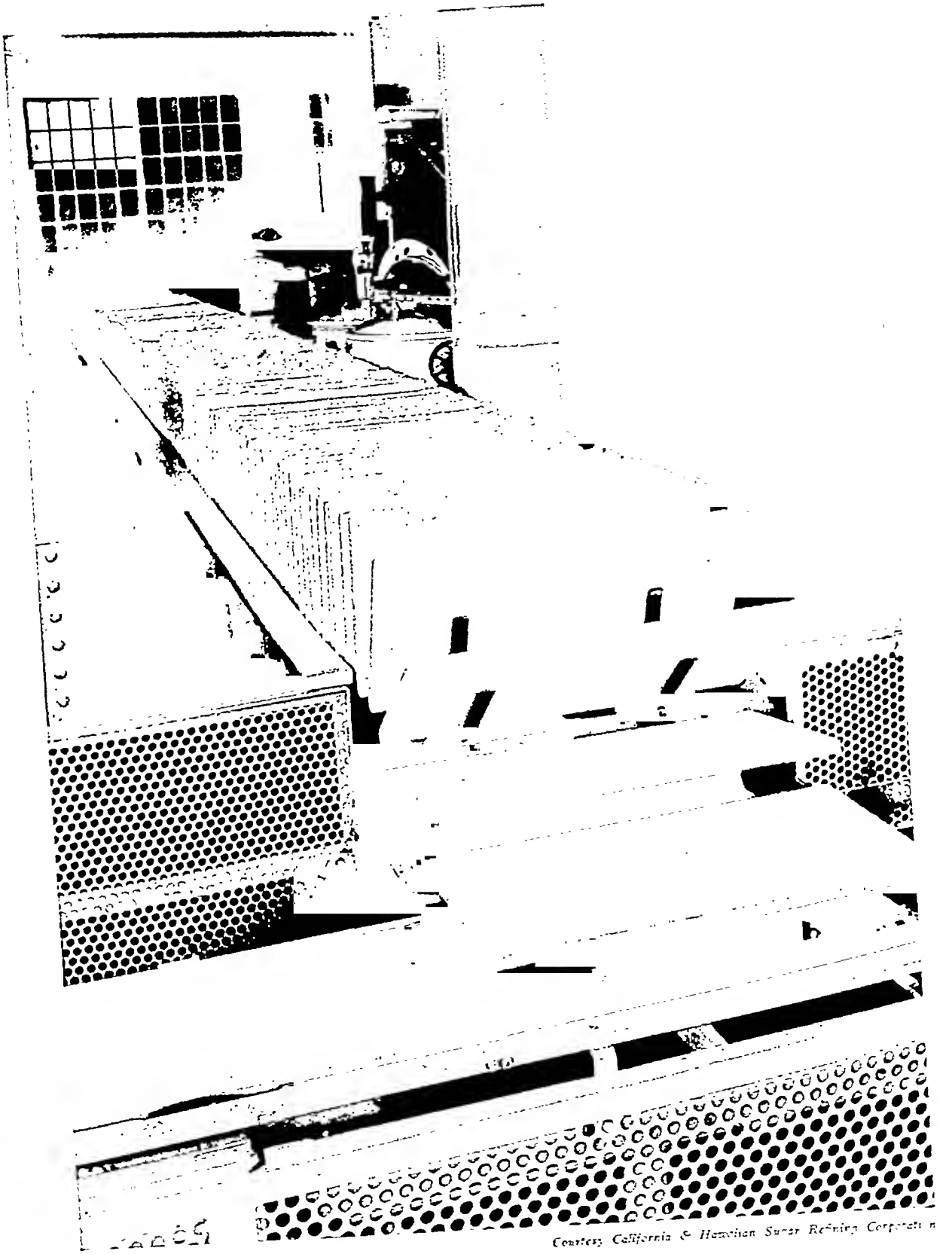
The first sugar package, it should be pointed out, was not the modern type of light cardboard carton. It was simply a soft, sealed paper bag, adapted from a coffee package. The American Sugar Refining Company first introduced the cardboard carton in which refined sugar for household use is commonly sold today.

Besides the change in methods of packaging, a second important development has been in the forms in which sugar is available to the consumer. In addition to the three general types: brown sugars, powdered sugars, and tablets or cubes, all antedating granulated sugar, many new forms and sub-divisions of older types of sugar have been developed.

The brown sugars are further sub-divided into the so-called "old-fashioned" brown and the light brown or yellow sugars, reaching as many as fifteen grades, and presenting a hygienic contrast to the original "brown sugar," a product of primitive tropical milling methods. The flavor, and moisture retaining properties of these sugars find application all the way from baking and confections to meat curing and tobacco treatment.

A modern refining product is a sugar consisting of exceedingly small crystals designed for quick dissolving. Sugar is made for vegetable canners, carefully freed from thermophilic bacteria, and a "transformed sugar," the crystals of which contain tiny cracks or recesses, has remarkable dissolving properties. It also retains air in it, making for a frothy lightness in icing and bakery usage. A recently developed product is a powdered sugar-cinnamon mixture for use on toast or buns. One of the larger refining companies now produces altogether 62 types of sugar, and 277 different packagings.

In conclusion, it may be observed that sugar offers one of the best examples of the improvement of a common commodity by the application of the sciences in an industrial civilization. It also has played an important economic and political role from the mid-seventeenth century to the present time. The seventeenth century American knew sugar only as an imported product, for luxury use. The eighteenth century American built up a sugar trade which helped influence the course of the nation. The nineteenth century saw sugar pass from a luxury to a necessity. The twentieth century has been characterized by the development of an elaborate distribution and sales system, and the subjection of the industry to a large measure of governmental regulation and administration, which, however, is outside the scope of the present article.



Slabs of Pure Refined Sugar Traveling to the Machines That Will Automatically Cut and Chip Them Into Tablet Form

Cane Sugar Refining

THE cane sugar refining industry in the United States goes back to the colonial period. Records show that at least one "Sugar House" was in existence as early as 1689 in New York, and a report of the British Board of Trade in 1731 states that there were then several "sugar bakeries" in New England. By the time the United States became an independent nation, sugar refining was well established as an important industry on the Atlantic seaboard. These refineries used raw sugar imported from the West Indies. During the nation's first sixty years, however, the consumption, and consequently the imports, of sugar were relatively small. Not until 1847 did the production of refined sugar rise above 100,000 short tons.

The chief centers of the industry during this early period were the same as at the present time; viz., New York, Philadelphia, Boston and New Orleans. It is interesting, however, to note that the first refineries were not situated on the waterfront. Locations directly accessible from deep water were not regarded as conferring special advantages, and refineries were established at different times at interior points, such as Cincinnati and St. Louis. The first waterfront refinery was built in 1858, when Frederick C. Havemeyer, of the family which figures so prominently in the history of the industry moved the business which the family had carried on previously on Manhattan Island to a waterfront location in Brooklyn. Other refiners followed his example, until the Brooklyn waterfront became the greatest sugar refining center in the world.

The growth of the industry in its early period was brought about by the multiplication of small plants, rather than by the enlargement of those already existing. Already, by 1830, there were thirty-eight refineries in the country, a larger number than exists at the present time. The production of refined sugar in that year, however, was only 40,000 short tons, and the combined capacity of all these establishments would not have equalled that of one of the larger present-day refineries. The next development of the industry was in the direction of concentration and technical improvement of methods and processes. The vacuum pan was developed in the eighteen thirties, and about the same time bone-black began to be used for decolorizing sugar. The main movement toward concentration of the industry, however, came in the eighteen seventies, when improved communications made transportation for long distances cheaper and speedier. In 1870 there were still more than fifty refineries in the United States, but by 1880 the number had diminished to twenty-seven.

After the mergers effected with the organization in 1887 of the Sugar Refineries Company, subsequently known as the "Sugar Trust," and the organization in 1891 of the American Sugar Refining Company, there were only seventeen active establishments. This may be said to mark the beginning of the modern era in the industry. An immediate result, induced by cheaper raw sugar prices and increasing consumption, was the construction during the period 1891-1900 of a considerable number of new refineries, including the National (Long Island City and Yonkers), Arbuckle, Franklin, McCahan, Henderson and Crockett. Of the twenty-two existing cane sugar refineries in the United States, thirteen date from 1901 or earlier. From 1923 until 1935, no new refineries were built, but many of the older plants were enlarged and remodelled. In 1936, a small refinery was erected in Brooklyn.

In recent years the continental cane refining industry has had to confront an increasing competition from sugar refined in the tropics, where newly developed processes utilizing vegetable carbons in place of bone-char have encouraged mills which formerly produced raw sugar to install equipment for the manufacture of the refined product.

In 1928 the cane sugar refiners, who previously had had no central organization, organized a trade association known as the Sugar Institute, Inc., for the purpose of acting as a central statistical bureau and an agency for concerted action in eliminating unfair and unethical practices which had developed under stress of competition in the sale of sugar. In 1932 the United States government brought suit against the Institute and its members, alleging violation of the federal anti-trust laws, and in 1934 a decision in favor of the government was rendered by the United States district court in New York which issued an order restraining the Institute from the practices held to be illegal. This decision subsequently, in March, 1936, was sustained by the Supreme Court of the United States. The Institute continued to function as a statistical bureau until the latter part of 1936 when it was dissolved, and a new organization, the United States Cane Sugar Refiners' Association, was formed.

From the statistics issued by the Sugar Institute the accompanying table has been compiled, showing refiners' annual deliveries of sugar to domestic consumption for the years beginning with 1927, together with comparative figures of deliveries of foreign refined and domestic beet sugar during the same period, in tons of 2,000 pounds (figures for 1936 and 1937 are from the statistics of the Sugar Section of the Agricultural Adjustment Administration):

Year	U. S. Refined	Foreign and Insular	Beet	Total
1927	4,943,178	170,376	865,425	5,978,979
1928	4,763,146	276,698	1,187,080	6,226,924
1929	4,995,534	349,979	953,652	6,299,165
1930	4,875,842	397,734	1,060,481	6,334,057
1931	4,403,415	484,327	1,269,276	6,157,018
1932	4,039,642	659,411	1,233,808	5,932,861
1933	3,897,356	685,786	1,279,650	5,862,792
1934	3,815,991	520,270	1,460,880	5,797,141
1935	4,173,092	526,348	1,388,422	6,087,862
1936	4,210,875	681,519	1,288,177	6,180,571
1937	4,389,969	593,094	1,157,002	6,140,065

The combined capacity of the cane sugar refineries in the continental United States is approximately 27,000 tons of raw sugar per day of 24 hours, or more than 8,000,000 short tons of refined sugar per year.

UNITED STATES CANE SUGAR REFINERIES

American Sugar Refining Company, 120 Wall Street, New York, N. Y. Capital Stock, $45,000,000 preferred; $45,000,000 common ($100 shares).

Earl D. Babst.....Chairman of the Board
W. Edward Foster.....Vice-Chairman
Joseph F. Abbott.....President
Ralpb S. Stubbs.....Vice-President
Edward A. Weber.....Vice-President
Arthur B. Wollam.....Vice-President and Treasurer
Henry Edgcumbe.....Secretary
D. H. Gibson.....Assistant Treasurer
Paul M. Ripley.....President, Brooklyn Cooperage Company

Refineries	Superintendent	Daily Melting Capacity (Tons per 24 Hours)
Boston, Mass.	R. C. Folsom	1,004
Brooklyn, N. Y.	A. B. Babcock	1,116
*Philadelphia, Pa.	W. J. Gilligan	1,790
Chalmette, La.	W. J. Crane	1,790
Baltimore, Md.	R. Mommers	1,334

*Franklin Sugar Refining Co.

Arbuckle Bros., 71 Water Street, New York, N. Y. A partnership. No capital stock.

Refinery	Daily Melting Capacity (Tons per 24 Hours)
Brooklyn, N. Y.	1,250

California & Hawaiian Sugar Refg. Corp., Ltd., 215 Market Street, San Francisco, Calif. Capital stock, $10,000,000. (Shares of $100 par.)

F. E. Sullivan.....President and General Manager
A. A. Smith.....Vice-President, Sales
H. C. Welle.....Vice-President, Production
C. E. Schink.....Vice-President, Finance and Accounting
L. L. Edmunds.....Plant Engineer
E. M. Bergh.....Refinery Superintendent

Refinery	Daily Melting Capacity (Tons per 24 Hours)
Crockett, Calif.	2,750

Colonial Sugars Company, 120 Wall Street, New York, N. Y. Capital stock owned by Cuban American Sugar Company.

Refinery	Daily Melting Capacity (Tons per 24 Hours)
Gramercy, La.	717

Franklin Sugar Refining Co., Philadelphia, Pa. Capital stock owned by American Sugar Refining Company (which see).

Godchaux Sugars, Inc., Carondelet Bldg., New Orleans, La. Capital stock, 30,500 shares preferred; $5,250 Class A; $5,250 Class B (no par value).

Refinery	Manager	Daily Melting Capacity (Tons per 24 Hours)
Reserve, La.	F. A. Gayle	2,051

Henderson Sugar Refinery, 749 So. Peters St., New Orleans, La. A co-partnership. No capital stock.

Refinery	Daily Melting Capacity (Tons per 24 Hours)
New Orleans, La.	500

Imperial Sugar Company, Sugar Land, Texas. Capital stock: 35,000 shares preferred, 100,000 shares common; no par value.

Refinery	Manager	Daily Melting Capacity (Tons per 24 Hours)
Sugar Land, Tex.	H. G. Thompson	670

W. J. McCahan Sugar Refining & Molasses Co., 101 So. Front St., Philadelphia, Pa. Capital stock, $3,500,000 preferred, $3,500,000 common ($100 par value).

Refinery	Daily Melting Capacity (Tons per 24 Hours)
Philadelphia, Pa.	669

National Sugar Refining Co. of New Jersey, 129 Front St., New York, N. Y. Capital stock, 600,000 shares (no par value).

William K. Dick.....Chairman Executive Committee
Charles D. Bruyn.....President
J. Henry Lienau.....Vice-President
Ellsworth Bunker.....Vice-President and Treasurer
Walter J. Vreeland.....Secretary

Refineries	Daily Melting Capacity (Tons per 24 Hours)
Long Island City, N. Y.	2,000
Edgewater, N. J.	2,000

Pennsylvania Sugar Company, 1037 N. Delaware Ave., Kensington, Philadelphia, Pa. Capital stock, $5,000,000 (shares of $20 par value).

Refinery	Daily Melting Capacity (Tons per 24 Hours)
Philadelphia, Pa.	2,140

Revere Sugar Refinery, 15 Broad St., Boston, Mass. Capital stock, 75,000 shares, no par value (all owned by United Fruit Company).

Refinery	Manager	Daily Melting Capacity (Tons per 24 Hours)
Boston, Mass.	John W. Lowe, Jr.	900

Savannah Sugar Refining Corp., Savannah, Ga. Capital stock; 36,535 shares preferred ($100 par); 57,500 shares common (no par).

Refinery	Manager	Daily Melting Capacity (Tons per 24 Hours)
Savannah, Ga.	W. W. Sprague	1,200

Southdown Sugar Refining Company, Houma, La.

Refinery	Daily Melting Capacity (Tons per 24 Hours)
Southdown, La.	150

Sterling Sugars, Inc., Franklin, La.

Refinery	Manager	Daily Melting Capacity (Tons per 24 Hours)
Franklin, La.	W. C. Kemper	310

Sucrest Corporation, 120 Wall Street, New York, N. Y.

Charles W. Taussig.....Chairman of the Board
Lawrence G. Washburn.....President
Clarence E. Heath.....Vice-President in Charge of Production
William Lohr.....Secretary
Charles Levy.....Treasurer
Edith F. Vyner.....Assistant Treasurer
Ellis Slatoff.....Controller

Refinery	Plant Manager
Brooklyn, N. Y.	Frank C. Staples

Western Sugar Refinery, 2 Pine St., San Francisco, Calif. Capital stock owned by J. D. & A. B. Spreckels Company, San Francisco.

Refinery	Superintendent	Daily Melting Capacity (Tons per 24 Hours)
San Francisco, Calif.	N. E. Dole	1,200

Map of
HAWAII
Showing Location of Sugar Mills

Hawaii

WHEN Captain Cook landed in the Hawaiian Islands in 1778 he found sugar cane growing there, but the production of sugar did not become established as a permanent industry until 1835. The real growth of the industry dates from 1875, when a reciprocity treaty with the United States permitted free entry of Hawaiian sugar. At that time the total production of the islands was about 10,000 long tons, which had increased to over 200,000 tons in 1898 when Hawaii was annexed to the United States.

The Hawaiian sugar industry has shown great improvement in the yields of cane and sugar obtained per acre through the scientific application of irrigation and fertilization, selection of improved varieties of cane and improved methods of cultivation, and the constant study of methods of overcoming insect pests and diseases. Having only a limited area available for cane growing, the Hawaiian sugar producers turned their attention to intensive methods of cultivation and yearly spend hundreds of thousands of dollars on research and experiment through the Hawaiian Sugar Planters' Experiment Station. As a result of their efforts, the average yield of sugar per acre has risen to between seven and eight tons and has reached the remarkable figure of eighteen short tons per acre on particular fields.

The area of cane harvested was 114,000 acres in the season of 1922-23 and reached 139,744 acres in 1931-32, while the yield of sugar per acre increased in the same period from 4.25 to 6.55 long tons.

In Hawaii the harvesting and grinding of cane continues throughout the year. The crop year is reckoned from October 1 to September 30. In the table the figures given for each calendar year represent production in the campaign season ending in that year. Thus, the figure opposite 1930 is the output during the year ending September 30, 1930. For the sake of uniformity figures of production are stated in long tons of 2,240 pounds, although Hawaii uses the ton of 2,000 pounds.

Hawaii's annual sugar production for the past thirty years is shown in the following table.

Year	Long Tons	Year	Long Tons
1908	465,288	1923	479,493
1909	477,818	1924	620,000
1910	461,688	1925	692,504
1911	506,000	1926	705,350
1912	531,480	1927	724,403
1913	488,212	1928	807,180
1914	550,927	1929	825,893
1915	577,183	1930	827,904
1916	529,895	1931	887,320
1917	575,512	1932	915,495
1918	515,037	1933	924,595
1919	537,242	1934	850,166
1920	508,470	1935	880,422
1921	508,392	1936	907,474
1922	502,194	1937	821,990

Following is a list of Hawaiian sugar plantations with their ownership, location and grinding capacities.

SUGAR PLANTATIONS IN HAWAII

Plantation	Location	Owner or Agent	Capacity Tons Cane per 24 Hrs.
Ewa	Ewa, Oahu	Castle & Cooke, Ltd	1910
Gay & Robinson	Makaweli, Kauai	Bishop Trust Co., Ltd.	No mill
Grove Farm Co., Ltd.	Puhi, Kauai	American Factors, Ltd.	No mill
Hakalau	Hakalau, Hawaii	Hakalau Plantation Co.	1000
Hamakua Mill Co.	Kukaiau, Hawaii	Hamakua Mill Co.	900
Hawaiian Agricultural Co.	Pahala, Hawaii	C. Brewer & Co., Ltd.	1200
Hawaiian Commercial & Sugar Co.	Puunene, Maui	Alexander & Baldwin, Ltd.	5000
Hawaiian Sugar Co.	Makaweli, Kauai	Alexander & Baldwin, Ltd.	1500
Hilo Sugar Co.	Hilo, Hawaii	C. Brewer & Co., Ltd.	1225
Honokaa	Haina, Hawaii	F. A. Schaefer & Co., Ltd.	1100
*Honolulu	Aiea, Oahu	C. Brewer & Co., Ltd.	1200
Honomu Sugar Co.	Honomu, Hawaii	Honomu Sugar Co.	725
Hutchinson	Naalehu, Hawaii	Honomu Sugar Co.	715
Kaeleku	Haina, Maui	C. Brewer & Co., Ltd.	715
Kahuku	Kahuku, Oahu	Alexander & Baldwin, Ltd.	925
Kaiwiki Sugar Co., Ltd.	Ookala, Hawaii	T. H. Davies & Co., Ltd.	425
Kekaha Sugar Co., Ltd.	Kekaha, Kauai	American Factors, Ltd.	1100
Kilauea	Kilauea, Kauai	Kilauea Sugar Plantation Co.	440
Kipu	Lihue, Kauai	American Factors, Ltd.	No mill
Kohala Sugar Co.	Hawi, Hawaii	Castle & Cooke, Ltd.	1540
Koloa Sugar Co.	Koloa, Kauai	American Factors, Ltd.	671
Laupahoehoe Sugar Co.	Papaaloa, Hawaii	Laupahoehoe Sugar Co.	950
Lihue	Lihue, Kauai	American Factors, Ltd.	1500
*Maui	Paia, Maui	Maui Agricultural Co., Ltd.	3000
McBryde Sugar Co., Ltd.	Eleele, Kauai	Alexander & Baldwin, Ltd.	1400
Oahu Sugar Co., Ltd.	Waipahu, Oahu	American Factors, Ltd.	2800
Olaa Sugar Co., Ltd.	Olaa, Hawaii	American Factors, Ltd.	2015
Onomea Sugar Co., Ltd.	Papaikou, Hawaii	C. Brewer & Co., Ltd.	1400
Paauhau	Paauhau, Hawaii	Paauhau Sugar Plantation Co.	1100
Pepeekeo Sugar Co.	Pepeekeo, Hawaii	Pepeekeo Sugar Co.	850
Pioneer Mill Co., Ltd.	Lahaina, Maui	Pioneer Mill Co., Ltd.	1570
Waiakea Mill Co.	Hilo, Hawaii	T. H. Davies & Co., Ltd.	800
Waialua Agricultural Co.	Waialua, Oahu	Waialua Agricultural Co., Ltd.	2100
Waianae Co.	Waianae, Oahu	American Factors, Ltd.	715
Wailea Milling Co., Ltd.	Hakalau, Hawaii	Wailea Milling Co., Ltd.	285
Wailuku Sugar Co.	Wailuku, Maui	Wailuku Sugar Co.	1100
Waimanalo Sugar Co.	Waimanalo, Oahu	C. Brewer & Co., Ltd.	470
Waimea Sugar Mill Co., Ltd.	Waimea, Kauai	American Factors, Ltd.	450

*Equipped to make refined sugar.

ISABELA
PLAZUELA
LOS CANOS
CAMBALACHE
MONSERRATE
COLOSO
PLATA
SOLIER
CARMEN
SAN JUANITA
VICTORIA
CANDONGA
IGUALDAD
DEFENSA
UNCOS
SANTA JUANA
SANTA BARBARA
PELLEJAS
HERMINIA
GAYEY
EJEMPLO
MERCEDITA
ROIG
MAYAGUEZ
ROCHELAISE
EUREKA
RUFINA
GUANICA

Puerto Rico

ALTHOUGH the sugar industry was established in Puerto Rico shortly after the Spanish occupation in 1509, it encountered many vicissitudes and was of slow growth until the middle of the nineteenth century. At that time production had reached 50,000 tons and in 1870 it exceeded 100,000 tons, the highest output obtained while the island remained under Spanish domination. The abolition of slavery following that date and the increased competition from the growth of sugar production in other parts of the world resulted in a slow decline and in 1899 the crop was only 35,000 long tons.

A rapid revival took place when the island became a part of the United States. The growth in production since that time is shown by the following table which gives output in long tons of 96° raw sugar for the past thirty years. The reduced production of the 1933 crop was due to damage caused by a destructive hurricane which swept the northern and eastern coasts of the island in September, 1932. Production in 1935 was reduced in order to bring it within the quota limit fixed under the Agricultural Adjustment Act.

Year	Tons	Year	Tons
1909	247,405	1924	565,146
1910	309,620	1925	590,237
1911	305,660	1926	558,354
1912	331,518	1927	561,726
1913	355,360	1928	670,852
1914	313,982	1929	523,893
1915	309,366	1930	775,310
1916	431,776	1931	699,715
1917	449,180	1932	886,100
1918	405,175	1933	744,919
1919	362,500	1934	994,074
1920	455,100	1935	697,090
1921	438,494	1936	826,817
1922	362,415	1937	889,594
1923	265,242	1938 (Est.)	890,000

SUGAR MILLS IN PUERTO RICO

Mill	Location	Owner	Capacity (Tons Cane per 24 Hrs.)
*Aguirre	Aguirre	Central Aguirre Associates	5700
Boca Chica	Ponce	Wirshing & Co.	1450
Cambalache	Arecibo	Central Cambalache, Inc.	5000
Canovanas	Canovanas	Loiza Sugar Co. (Subsidiary of Fajardo Sugar Co.)	2735
Caribe	Salinas	Godreau, Godreau y Cia.	655
*Carmen	Vega Alta	Carmen Centrale, Inc.	1000
Cayey	Cayey	Eastern Sugar Associates	450
Coloso	Coloso	Central Coloso, Inc.	2300
Constancia	Ponce	Corp. Azucarera Sauri y Subira	550
Constancia	Toa Baja	Cia. Azucarera del Toa	1500
Cortada	Santa Isabel	Central Aguirre Sugar Co. (Central Aguirre Associates)	1278
Defensa	Caguas	Eastern Sugar Associates	1100
El Ejemplo	Humacao	Cia. Azucarera El Ejemplo	810
Eureka	Hormiguero	Central Eureka, Inc.	1150
Fajardo	Fajardo	Fajardo Sugar Co. of P. R.	4000
Guamani	Guayama	Sucs. de Jose Gonzalez & Co.	1300
*Guanica	Ensenada	South Porto Rico Sugar Co.	7000
Herminia	Villalba	Herminia Colon. Vda. de Semidey	150
*Igualdad	Mayaguez	Central Igualdad, Inc.	1100
Juanita	Bayamon	Central Juanita, Inc.	1000
Juncos	Juncos	Eastern Sugar Associates	2000
Lafayette	Arroyo	United States Government	2295
Los Caños	Arecibo	Plazuela Sugar Co., Inc.	1000
Machete	Guayama	Central Machete Co. (Central Aguirre Associates)	1500
Mercedita	Ponce	Sucesión J. Serralles	5000
Monserrate	Manati	Jaime y Federico Calaf Collazo	1000
Pasto Viejo	Humacao	Eastern Sugar Associates	2515
Pellejas	Adjuntas	Jorge Lucas P. Valdivieso	200
Plata	San Sebastian	Plata Sugar Co., Inc.	950
Playa Grande	Vieques	Benitez Sugar Co.	1200
Plazuela	Barceloneta	Plazuela Sugar Co., Inc.	1750
Rochelaise	Mayaguez	Mayaguez Sugar Co., Inc.	1000
*Roig	Yabucoa	Yabucoa Sugar Co.	2184
Rufina	Guayanilla	Mario Mercado e Hijos	2000
*San Francisco	Guayanilla	A. Lluberas y Sobrinos	360
San Vicente	San Vicente	Rubert Hermanos, Inc.	2000
Santa Barbara	Jayuya	Jayuya Development Co.	500
Santa Juana	Caguas	Eastern Sugar Associates	1000
Soller	Arecibo	Soller Sugar Co., Inc.	500
Vannina	Rio Piedras	Central Vannina, Inc.	1440
Victoria	Carolina	Sucesión de Don Luis Rubert y Catalá	1585

*Also produces refined sugar.

REFINERY

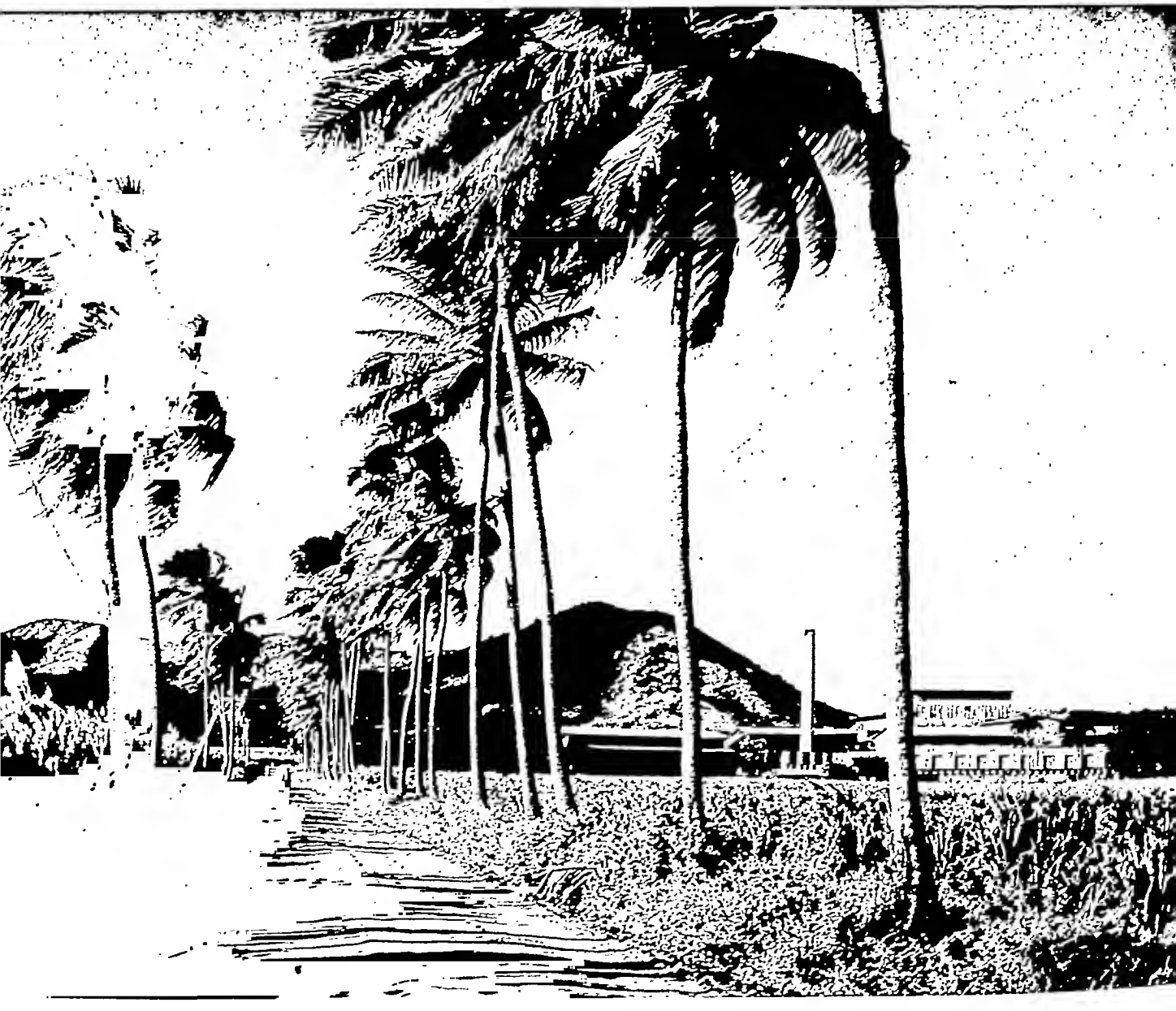
Mercedita	Ponce	Porto Rican American Sugar Refinery, Inc.	1350

Virgin Islands

THE VIRGIN ISLANDS of the United States, formerly the Danish West Indies, became an American dependency in 1917. Sugar is produced only on one island, St. Croix, although the industry was introduced first in St. Thomas, in 1671. It formerly was more important and extensive than now, St. Croix in 1796 having more than 250 small mills. Eventually production was concentrated in three central mills. Since 1917 the industry has suffered from the effects of prohibition in the United States and from a series of bad seasons due to severe drouths. From 1900 to 1912 sugar production averaged around 12,000 long tons annually, but for the past ten years the average has been about 5,250 tons, amounting to only 1,800 tons in 1930-31, 4,087 tons in 1931-32, 4,230 tons in 1932-33, 4,722 tons in 1933-34, 2,210 tons in 1934-35, 3,357 tons in 1935-36, and 7,570 tons in 1936-37. The 1937-38 crop estimate is 8,000 tons. A revival of the sugar and allied rum industries with federal government funds has progressed since 1934.

VIRGIN ISLANDS SUGAR MILLS

Mill	Location	Owner	Capacity (Tons Cane per 24 Hrs.)
Bethlehem	Kingshill, P. O., St. Croix	The Virgin Islands Company	700
La Grange	Frederiksted, St. Croix	La Grange Sugar Factory, Inc.	350



General View of the Bethlehem Mill, St. Croix, Virgin Islands

Canada

THE PRODUCTION of beet sugar in Canada as a settled industry dates from 1901 when four factories were erected in the Province of Ontario. Sugar beets, however, have been grown in Canada for the past fifty years. Of the four early factories, only one remains. The Dominion Sugar Company, in 1916, erected a factory at Chatham, Ontario, which has been in successful operation since that time. In 1903, a plant was built at Raymond, Alberta. Later this was removed to the United States, but in 1925 the Utah-Idaho Sugar Company established a second factory at Raymond through a subsidiary company, Canadian Sugar Factories, Ltd. The factory is now controlled by the British Columbia Sugar Refining Company. A second beet sugar factory, erected by this company at Picture Butte, Alberta, commenced operation in 1936.

Production of beet sugar in Canada for the past twenty years, in tons of 2,240 pounds, has been as follows:

Year	Tons	Year	Tons
1918-19	16,895	1928-29	28,840
1919-20	39,857	1929-30	29,810
1920-21	25,600	1930-31	40,950
1921-22	13,355	1931-32	47,850
1922-23	17,600	1932-33	57,279
1923-24	16,500	1933-34	58,545
1924-25	36,200	1934-35	49,951
1925-26	32,475	1935-36	55,847
1926-27	28,250	1936-37	67,785
1927-28	27,252	1937-38 (Est.)	53,716

There are six cane sugar refineries in Canada, at Toronto, Halifax, St. John (N. B.), Montreal (two), and Vancouver on the Pacific coast. The Toronto refinery, originally established by Crosse & Blackwell (Canada), Ltd., to refine sugar for the company's own use, commenced refining sugar for the general market in 1934. It was taken over by the Beamish Sugar Company in 1936. Cane sugar is sometimes refined in the beet sugar factories of the Canada and Dominion Sugar Company.

CANADIAN SUGAR REFINERIES

Acadia Sugar Refining Co., Ltd., 235 Hollis St., Halifax, Nova Scotia.

Refinery	Plant Manager	Daily Melting Capacity (Tons)
Woodside, Dartmouth	J. S. Misener	670

Atlantic Sugar Refineries, Ltd., Montreal, Quebec.

Refinery	Plant Manager	Daily Melting Capacity (Tons)
St. John, N. B.	A. F. Blake	600

Beamish Sugar Refineries, Ltd., 587 Fleet Street, Toronto, Ontario.

Refinery	Plant Manager	Daily Melting Capacity (Tons)
Toronto	R. D. Beamish (President)	80

British Columbia Sugar Refining Co., Ltd., Vancouver, B. C., Canada.

Refinery	Daily Melting Capacity (Tons)
Vancouver, B. C.	500

Canada and Dominion Sugar Co., Ltd., Montreal, Quebec.

Refinery	Branch Manager	Daily Melting Capacity (Tons)
Montreal, Quebec	C. J. Coyle	900

St. Lawrence Sugar Refineries, Ltd., Dominion Express Bldg., Montreal, Quebec.

Refinery	Plant Manager	Daily Melting Capacity (Tons)
Montreal, Quebec	M. M. Jetmore	650

CANADIAN BEET SUGAR FACTORIES

Canada and Dominion Sugar Company, Ltd. Executive Office, Chatham, Ontario.

Charles H. Houson	President
W. J. McGregor	Secretary and Treasurer
R. A. Eamer	Sales Manager
A. W. McIntyre	Assistant to President
C. A. Moulthrop	General Superintendent

Factories	Daily Capacity (Tons Beets)	Superintendent
Wallaceburg, Ont.	2,400	R. A. Lauber
Chatham, Ont.	2,800	C. McCarron
	5,200	

Canadian Sugar Factories, Ltd. Executive Office, Raymond, Alberta.

E. T. Rogers	President
R. Adamson	Secretary
T. George Wood	District Manager

Factories	Daily Capacity (Tons Beets)	Factory Superintendent
Raymond, Alta.	1,200	C. H. Wise
Picture Butte, Alta.	1,400	

Mexico

OWING to the physical conformation of Mexico, sugar cane is grown under widely varying conditions in different parts of the country, from the humid region along the Gulf Coast through the upland districts of the interior to the low-lying areas of the Pacific littoral where irrigation is necessary because of the lack of rainfall. Very large crops can be grown on the better situated cane lands, labor is plentiful and not expensive, and in many sections climatic conditions are almost ideal for the cane crop.

While the first sugar mill in the country is said to have been built in 1520, the industry grew slowly until the beginning of the present century. In the last ten years steady expansion of production has taken place.

This year Azucar, S. A., the central marketing agency of Mexico's sugar crop, was converted into a non-profit cooperative organization, the National Union of Sugar Producers. Any sugar man may join this union. The government will aid the industry by a subsidy, which will be derived from a sugar sales tax, increased from one centavo to six centavos, about 0.7 cent per pound.

The accompanying table gives output by years in tons of 2,240 pounds since 1909:

Year	Tons	Year	Tons
1909	141,012	1924	166,932
1910	145,565	1925	165,223
1911	161,600	1926	190,282
1912	151,735	1927	181,858
1913	148,672	1928	175,214
1914	127,944	1929	179,124
1915	110,000	1930	209,730
1916	65,000	1931	260,623
1917	50,000	1932	232,260
1918	40,000	1933	209,575
1919	70,000	1934	177,108
1920	92,000	1935	256,911
1921	110,700	1936	303,388
1922	129,218	1937	270,836
1923	149,383	1938 (Est.)	295,200

SUGAR MILLS IN MEXICO

STATE OF CHIAPAS

Mill	Location	Owner
Santa Ana	Pichucalco	Antonio G. Saury

STATE OF COLIMA

Nogueras	Colima	Vergara y Rangel
Quesería	San Geronimo	Cía. Agricola Jalisciense
San Antonio	Alvarez	Arnoldo Vogel

STATE OF JALISCO

Ahuacapan	Autlan	Carlos Valencia
Amatitlan	Sayula	Nicolás de la Peña Sucrs.
Belen	Pihuamo	María Camarena
Bellavista	Santa Ana	Riegos E. Industrias Bellavista, S. A.
California	Cocula	Vizcarra de Palomar, Luz.
Cofradia	Cocula	Senén Palomar
Contla	Tamazula	Dolores E. Vda. de Newton
El Cabezon	Ameca	Manuel C. Cañedo
El Cuiz	Ameca	Fco. Fdez. del Valle
El Rincón	Zapoltitic	Hdo. El Rincón, S. C. P.
El Tule	Pihuamo	J. Manuel y Roberto Mendoza
Estipac	Villa Corona	Corcuera Hnos.
La Esperanza	Tonilita	Enriqué Schondube S. M. C. P.
La Guadalupe	Tecalitlan	Ingenio Guadalupe, S. A.
La Purisima	Tuxpan	Hijos de R. C. Ochoa
Occidente	Guadalajara	Unión Azuc. de Occidente
San Francisco	Ameca	Daniel Ochoa, Sucs.
San Ignacio	Ahualulco	Rafaela G. Vda. de Uribe
San Jose	Autlan	Carlos Valencia
San Marcos	Tonila	Hda. San Marcos, S. C. P.
San Miguel	Ameca	Juan L. Corcuera
San Vicente	Tamazula	Pedro Enriquez y Cia.
Santa Cruz	Zapoltitic	Santa Cruz y El Cortijo S. C. P.
Santa Rita	Mascota	Renteria Hnos.
Santiago	Tuxpan	Armando Gonzalez
Sayotlan	Tamazula	Cristina Arias Vda. de Ramirez
Tala	Tala	Central Tala, S. A.
Tamazula	Tamazula	Central Tamazula, S. A.

STATE OF MICHOACAN

Cahualote	Tacambaro	Joaquin A. Oseguera
Cerritos	Los Reyes	Rafael Valladares
Chipio	Tacambaro	Cristobal Alvarez
Guaracha	Guaracha	Manuel G. Moreno
Guarachita	Guarachita	Ingenio Guarachita
Laureles	Zitacuaro	F. Rodriguez Hernández
Los Bancos	Parácuaro	Rosa T. Vda. de Huetado
Los Cerritos	Los Reyes	Valladares Hermanos
Pedernales	Tacámbaro	Cia. Mex. de Agric. e Inversiones, S. A.
Pucuaro	Tacámbaro	Suc. M. Rodriguez
Puruaran	Tacámbaro	Gómez, Ochoa y Cia. en Lig.
San Ignacio	Moreno	Ingenio San Ignacio
San Juan de Dios	Los Reyes	Test. A. Gallardo

Mill	Location	Owner
San Sebastian	Los Reyes	J. M. Guizar V.
San Simon	Zamora	H. Sánchez
Santa Clara	Los Reyes	Barreto y Ochoa
Tepenahua	Ario de Rosales	Fernández y Castaño
Tipitaro	Taretan	Gabriel Iturbide
Tomendan	Tomendan	Miguel Echeverria

STATE OF MORELOS

Actopan	Tetecala	Maria Dominguez de Abe
E. E. Zapata	Zacatepic	Mexican Government
Miacatlan	Miacatlan	Enrique Olea
Oacalco	Yautepec	Ingenio de Ocacalco
Santa Ines	Cuautla	Maria Escandón de Buch

STATE OF NAYARIT

El Filo	Tecuala	Cia. Azucarero del Pacifico
El Molino	Tepic	Jose O. Manchaca
Escondida	Tepic.	Sucs. de Aguirre
Puga	Tepic	Sucs. de Aguirre
Tepuzhuacan	Ixtlan del Rio	Nacional Financiera, S. A.

STATE OF OAXACA

Arrazola y Guadalupe	Oaxaca	Avelino Lazarraga
Ayotla	Ignacio Mejia	Nacional Financiera, S. A.
Candiani	Oaxaca	Sodi Hnos.
La Pradera	Huajuapan	Gómez Hnos.
Santa Cruz	San Jerónimo	Jesús Lanvin
Santa Teresa de Jesus	Tehuantepec	Juana C. Romero Sucs.
Santa Teresa Huajuapan	Huajuapan	Mateo Solana
Santo Domingo	Unión Hidalgo	Ingenio de Santo Domingo

STATE OF PUEBLA

Atencingo	Chietla	Cia. Civil e Industria de Atencingo
Calipam	Coxcatlan	Depositario e Interventor del Ingenio Calipam
Raboso	Matomoros Izucar	Emilio Maurer Sers.
San José de Buenavista	Tehuacán	M. Urrutia Szcarra
San José Victoria	Acatlán	M. Ruiz
Tatetla	Matamoros Izucar	Cia. Agricola de Tatetla
Tilapa	Coxcatlan	Suen. de Leandro Aldama

STATE OF SAN LUIS POTOSI

Agua Buena	Agua Buena	Ingenio de Agua Buena, S. A.

STATE OF SINALOA

Aurora	Culiacán	Haciendas de Redo y Cia.
El Dorado	El Dorado	Haciendas de Redo y Cia.
El Guayabo	Mazatlán	Carlos Tirado
El Roble	Mazatlán	Haas Hermanos y Cia.
La Primavera	Navolato	Cia. Azuc. Almada S. C. (in liqd. Jud.)
Los Mochis	Los Mochis	United Sugar Cos., S. A.
Palos Blancos	Palos Blancos	Cia. Azuc. Palos Blancos
Sanalona	Culiacán	Alberto Vega y Cia.
San Lorenzo	Ahome	Ing. de San Lorenzo, S. C.

STATE OF TABASCO

El Carmelo	Jalapa	José Cruz Ulin
El Censo	Centro	Suc. Manuel L. Payró
El Edén	Cunduacan	F. de la Fuente Teiada
El Progreso	Jalapa	Alvarez, Gutiérrez y Cia.
La Unión	Jalapa	J. Ovidio Ruiz
Nueva Zelandia	Cárdenas	Hijas de Pedro Payró
Salamanca	Cunduacan	Fernando Hernández M. y César Sastre
San Cándido	Cárdenas	César Sastre V.
San Fidencio	Cunduacan	J. Oramas Bellos
Santa Isabel	Cárdenas	Payró Hnos.
Santa Rita	Cárdenas	Esteban Amat
Santa Rosa	Jalapa	Silverio Salcon Sotelo
Santa Rosalia	Cárdenas	Salomé Sastre
Santo Domingo	Huimanguillo	Juan Martinez Tortuco
Tulipán	Cunduacan	Test. de P. Valenzuela

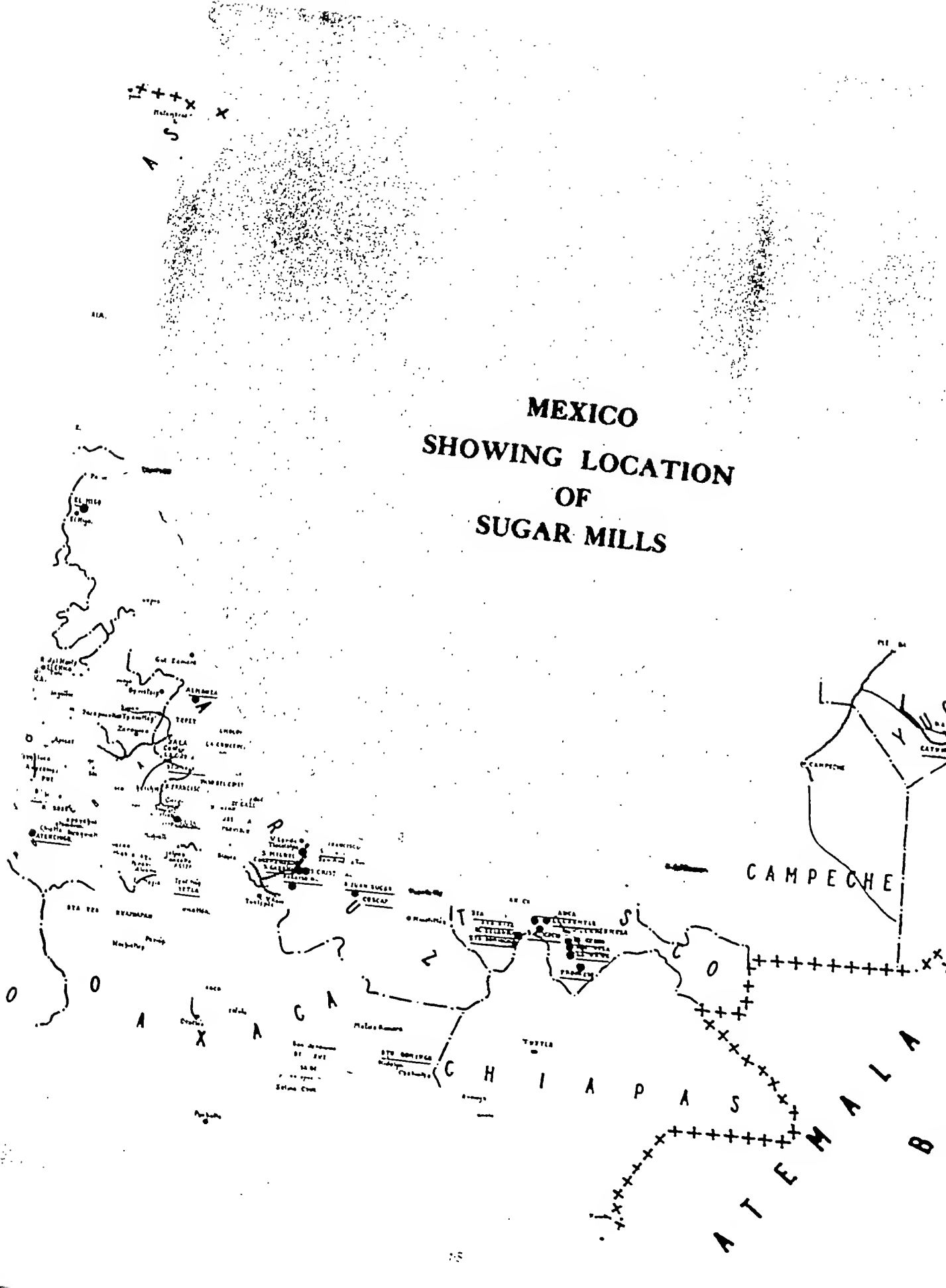
STATE OF TAMAULIPAS

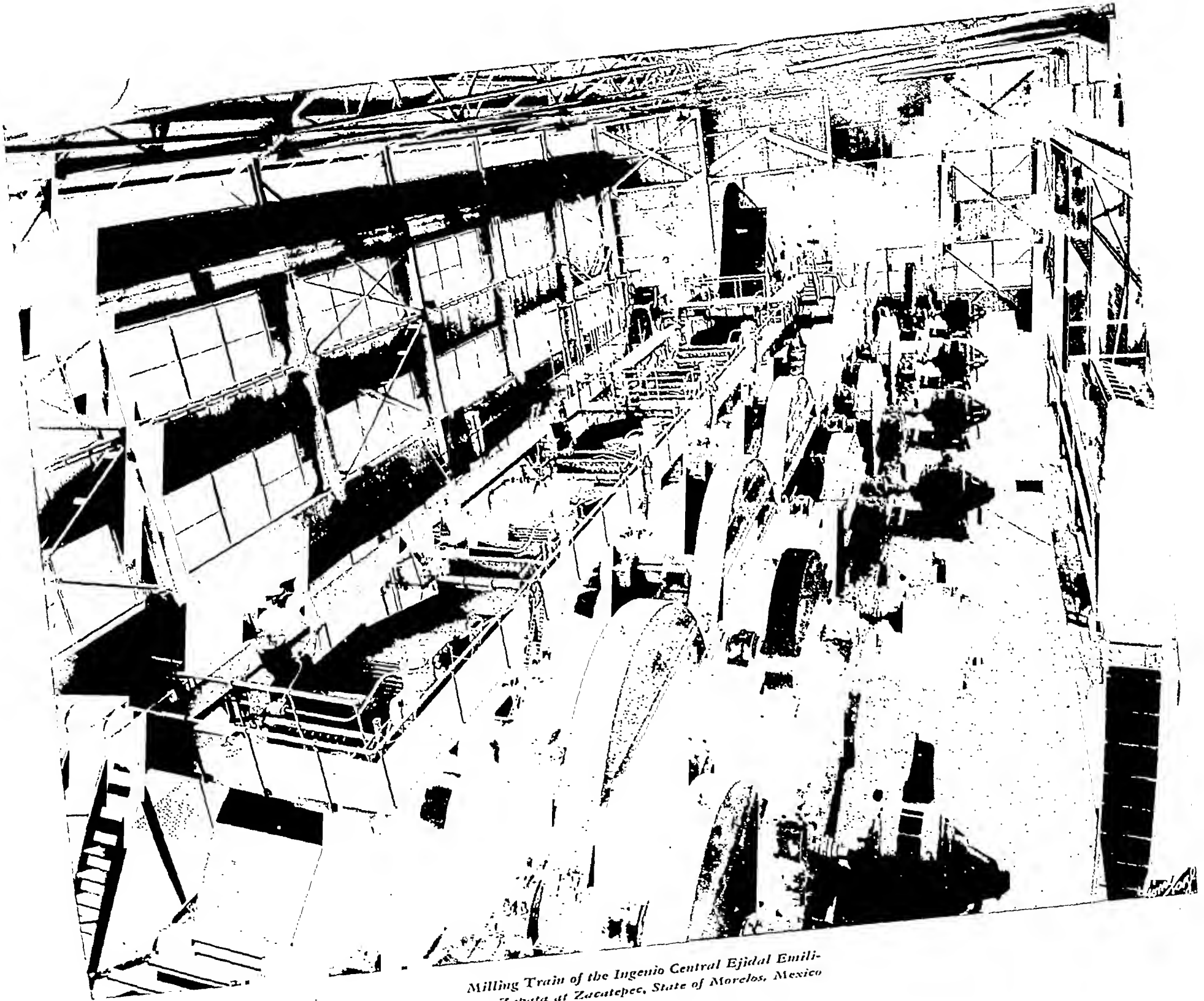
El Mante	Villa Juárez	Cia. Azuc. del Mante, S. A.

STATE OF VERA CRUZ

Almanza	Martinez de la Torre	Suc. de M. Zorrilla
Almolonca	Jalapa	M. Parra y P. Quiroz
Constancia	Minatitlán	Constancia Plantation C.
Coscapa	Chinameca	Pedro G. Valdés
Cuatotolapam	Cuatotolapam	Cia. Industrial Azucarera Cuatotolapam, S. C. P.
El Higo	Tempoal	Quiebra R. Mazare
El Modelo	Villa Cardel	Ingenio El Modelo, S. en C.
El Potrero	Córdoba	Cia. Manufacturera del Potrero, S. A.
Guautlapan	Orizaba	R. Segura


NUEVO
LEON
COAHUILA
DURANGO
ZACATECAS
NAYARIT
JALISCO
MICHOACAN
GUERRERO
ZACATECAS
TEPIC
GUADALAJARA
MORELIA
ACAPULCO


MEXICO
SHOWING LOCATION
OF
SUGAR MILLS
CAMPECHE
CHIAPAS



Milling Train of the Ingenio Central Ejidal Emiliano Zapata at Zacatepec, State of Morelos, Mexico

Mill	Location	Owner
Jalapilla	Orizaba	Luz Brineas
La Concepción	Jalapa	Luis Caraza
La Gloria	Villa Cardel	Dr. Enrique Osorio
La Orduna	Coatepec	Alfonso y Romualdo Pasquel
Mahuixtlán	Coatepec	María G. Vda. de Donde
Motzeronga	Córdoba	Motzeronga Sugar Co.
Paraíso Novillero	Cosamaloapam	Cía. Azuc. del Paraíso Novillero, S. A.
Paso de Cristo	Temaxcal	Vicente Lazzari y Hnos.
Potrerito	Camarón	Lazzari Hnos.
Providencia	Omealca	Fernández y Orozco
San Antonio	Tlacotalpam	Suc. de J. Lara Enriquez
San Cristobal	Cosamaloapam	Ing. S. Cristobal y Anex., S. A.
San Francisco	Lerdo de Tejada	José Sainz y Cía.
San Francisco y Toxpam	Córdoba	G. E. de Suinaga
San Isidro	Villa Lerdo de Tejada	Domingo Zamorano
San José de Abajo	San Juan de la Punta	C. & R. Perdomo
San Miguel	Tlacotalpam	José L. Pérez e hijos, Suc.
San Miguel y Santiago	Córdoba	Ricardo Céspedes
San Miguelito	Córdoba	Ricardo Céspedes
San Pedro	Villa Lerdo de Tejada	Antonio Gonzáles
Santa Fe	Tlacotalpam	Ingenio Santa Fe, S. A.
Santa Rosa	Teocelo	M. Sánchez Rebolledo
Tapia	Córdoba	Juan y Ruiz García
Tenampa	Noalinco	Adelaida G. de Escobar e hijos
Tepetlán	S. A. Tepetlán	Eleuterio Morlasca
Tuzamapam	Coatepec	Cía. Explotadora de Tuzamapam, S. A.
Zapoapita	Fortín	Test. de Elena, Vda. de Rincón

STATE OF YUCATAN

Catmis	Tzucacab	Cía. Agrícola del Sur y E. Cen.
Kakalna	Tzucacab	Fernando Lara Ancona
Thul	Tixkokob	Roque Herrera

Santo Domingo and Haiti

SUGAR cane growing in the island of Haiti, occupied by the two republics of Haiti and Santo Domingo, antedates the industry in other parts of America. The Spanish colonists introduced cane there in 1506. During the eighteenth century, when it was a French possession, Haiti produced 50,000 to 75,000 tons of sugar yearly, but the industry was completely wiped out after the overthrow of French authority. The principal site of sugar production in recent times, has been in the southern part of Santo Domingo. Haiti has one large modern sugar mill, situated near Port au Prince. Santo Domingo has sixteen centrals producing from 350,000 to 400,000 tons of sugar. Production for the past twenty years follows, in tons of 2,240 pounds:

Year	Santo Domingo	Haiti
1919	158,300	3,300
1920	175,756	4,125
1921	185,540	5,225
1922	157,145	12,284
1923	184,171	10,067
1924	229,373	5,581
1925	311,270	8,281
1926	354,720	11,249
1927	305,524	12,5[illegible]
1928	368,196	16,36[illegible]
1929	354,085	12,49[illegible]
1930	340,259	18,90[illegible]
1931	362,711	18,811
1932	427,621	20,947
1933	339,647	25,302
1934	382,374	25,495
1935	424,157	35,447
1936	449,817	37,500
1937	446,615	40,000
1938 (Est.)	450,000	37,000

SUGAR MILLS IN SANTO DOMINGO

Mill	Location	Owner	Capacity Cane Tons per 24 Hrs.
Amistad	Perez-Imbert	Ingenio Amistad C. por A.	700
Angelina	San Pedro de Macoris	Cia. Anonima de Inversiones Industriales	1500
Ansonia	Azua	Central Ansonia Sugar Co.	600
Barahona	Barahona	Barahona Co., Inc.	4000
Boca Chica	Andres	Cia. Azucarera Boca Chica, C. por A.	1200
Consuelo	San Pedro de Macoris	West Indies Sugar Corp.	3400
Cristóbal Colon	San Pedro de Macoris	Cristóbal Colon, Cia. por Acciones	1100
Italia	Yaguate	Cia. Anonima de Explotaciones Industriales	1500
Las Pajas	San Pedro de Macoris	West Indies Sugar Corp.	1200
Monte Llano	Puerto Plata	Chase National Bank of New York, Puerto Plata Sugar Co.	3000
Porvenir	San Pedro de Macoris	Ingenio Porvenir, C. por A.	1500
Quisqueya	San Pedro de Macoris	Cia. Azucarera Dominicana, C. por A.	1500
Romana	La Romana	South Porto Rico Sugar Co., Central Romana, Inc.	6425
San Isidro	Santo Domingo City	West Indies Sugar Corp.	1100
San Luis	Santo Domingo City	Ingenio San Luis, C. por A.	1500
Santa Fe	San Pedro de Macoris	South Porto Rico Sugar Co.	3200

SUGAR MILL IN HAITI

Hasco	Port-au-Prince	Haytian-American Sugar Co.	2400

Central America

AS in the other lands of Spanish America, sugar cane cultivation was introduced soon after the Spanish conquest into the territory now comprised within the Central American republics of Costa Rica, Guatemala, Honduras, Nicaragua, Panama, and Salvador. The industry in these colonies, however, never attained under Spanish rule the same degree of importance as in the West Indies and Mexico, while under the republics which succeeded to the dominion of Spain, its development was hampered by political instability and limited markets. Sugar production in these countries accordingly was, as in large degree it still is, carried on as a local industry to meet home consumption requirements. As late as 1914 the total output of all the Central American states, including the colony of British Honduras, was less than 25,000 long tons. The era of high prices during and after the world war, however, gave a stimulus to the industry, which added to that given by the gradual improvement in political and economic conditions within the republics, and for several years past production has averaged over 100,000 tons a year, a part of which is exported. About three-fourths of the annual output is produced in Guatemala, where sugar cultivation has developed further than in the neighbor states to the south.

The accompanying table gives the Central American production figures since 1917, in tons of 2,240 pounds:

Year	Tons	Year	Tons
1917	31,377	1928	95,921
1918	41,202	1929	73,774
1919	27,681	1930	103,400
1920	50,257	1931	129,660
1921	54,192	1932	103,067
1922	47,067	1933	106,653
1923	74,781	1934	74,781
1924	76,131	1935	94,215
1925	98,082	1936	103,794
1926	87,651	1937	103,180
1927	111,172	1938 (Est.)	98,000

SUGAR MILLS IN COSTA RICA

Factory	Location	Owner	Capacity (Tons Cane per 24 Hrs.)
Aguilar, José	Zarsero	José Aguilar.	
Aguilar, Pedro	Grecia	Otto Kopper.	
El Rodeo	El Rodeo	Max Gurdian.	
Fernandez, Santiago	San José	Santiago Fernandez.	
Herrero	Grecia	Felipa V. de Herrero.	
La Luisa	Sarchi	Castro Hermanos	
Lindo	Juan Vinas	Lindo Bros.	240
Niehaus, Guillermo	Grecia	Guillermo Niehaus & Co.	
Rosemount	Juan Vinas	Rosemount Estate.	
Ross	Santa Ana	Al. Ross.	
Santa Ana	Santa Ana	Guillermo Niehaus & Co.	120
Santa Barbara	Santa Barbara, Heredia	Jorge Seevers.	
Tempisque	Tempisque	Hijos de Federico Sobrado.	
Traube	Grecia	Rodolfo Traube.	
Tucurrique	Tucurrique	Manuel F. Kimenez.	
Turrialba	Turrialba	Guillermo Niehaus & Co.	264
Victoria	Grecia	Guillermo Niehaus & Co.	264

SUGAR MILLS IN GUATEMALA

Mill	Location	Owner
Chocola	Palo Gordo	Central American Plantations Co. of N. Y.
El Baul	Santa Lucia	Herrera Hnos.
El Salto	Escuintla	El Salto, Ltd.
Mauricio	Guatalon	Gerardo Rodriguez.
Mauricio	Mauricio	Banco de Occidente.
Mirandilla	Escuintla	Rosing Brothers.
Pantaleón	Escuintla	Herrera y Cia., Ltd.
San Antonio, Tulula	Cuyotenango	Antonio Bouscayrol.
San Diego	Escuintla	Ignacio G. Saravia.
Santa Teresa	Moran	Emilio Escamilla.
Torolita	Escuintla	Joaquin Torres e Hijos.

SUGAR MILLS IN HONDURAS

Mill	Location	Owner
La Concordia	Cantarransas, Tegucigalpa	St. Ignacio Agurica Estate.
Monte Cristo	Monte Cristo	Honduras Sugar & Distilling Co.
Sula	La Lima	Cuyamel Fruit Company.

SUGAR MILLS IN NICARAGUA

Mill	Location	Owner	Cane Capacity Cwts per 24 hours	Actual Capacity Cwts per 24 hours
Amalia	Nandaime	Suc. de Adolfo Benard	200	
Amolonca	Chinandega	Montealegre & Co., Ltd.		
Apante	Managua	Joaquim Gomez y hijo.	250	
Belgica	Chinandega	Jose A. Navarro.		
Central	Chinandega	Suc. Mateo Castillo	70	
Dolores	Rivas	David Morice.		
El Polvon	Granada	Cia. Azucarera El Polvon.		
Engracia	Rivas	M. Antonio Carazo.		
La Esperanza	Chinandega	Juan J. Cabrera & Co.		
Los Angeles	Chinandega	Juan J. Cabrera & Co.		
Montealegre	Chinandega	Manuela de Montealegre.		
Nicaragua	Granada	Nicaraguan Sugar Estates, Ltd.	1,200	6,000
Nueva Corcuera	León	Sánchez Hnos. & Co.		
Palermo	León	Sucs. de J. M. Arruello.		
San Antonio	El Viejo	Manuela Montealegre	35	
San Carlos	León	Maria V. de Martinez.		
San José	León	Enrique F. Sanchez.		
San Isidro	León	Jorge Deshon.		
San Pedro	León	Salvador Reyes & Francisco Icaza.		
San Rafael	Granada	Maria Benard de Cesar	120	1,000
Santa Clara	Posoltego	Roberto Gurdian	150	1,200
Santa Isabel	León	Alberto Reyes	80	1,500
Santa María	Managua	Vicente Zamorah.		
Santa Rita	Managua	F. Brockman & Co.		

SUGAR MILLS IN PANAMA

Mill	Location	Owner	Cane Capacity Cwts per 24 hours	Actual Capacity Cwts per 24 hours
La Envidio	Pesé, Herrera	José Varela.		
La Estrella de Chiriqui	Rovira, Los Santos	J. D. Arias	250	2,500
La Gloria	Panama City	Cia. Azucarera la Gloria.		
Mensabe	Las Tablas, Los Santos	Justo P. Chorrera Ch	100	700
Ofelina	Aguadulce, Cocle	R. Chiari.	550	1,200
Potrerillos	Potrerillos, Chiriqui	Zahira H. Vda. de Herrera	300	750
San Isidro	Pesé, Herrera	Aristides Arjona.		
Santa Rosa	Aguadulce, Cocle	Delvalle, Henriquez & Co	550	1,200

SUGAR MILLS IN SALVADOR

Mill	Location	Owner	Cane Capacity Cwts per 24 Hrs
Ayuta	Santa Ana	Borchi B. Dreghi y Cia.	
Azuchio	Zaragoza, La Libertad	Jose Parker.	
Chammico	Sitio del Niño	Letona, Quiñonez y Cia.	
Colima	Suchitoto	Suc. de Eduardo Orellana.	
El Angel	Apopa	Guillermo Melendez	
El Carmen	Izalco, Sonsonate	Arturo Araujo	
El Castaño	Nejapa	C. K. Villanueva e Hnos.	
Elena	San Marcos	Galleces Hermanos	
El Platanar	Suchitoto, Cuscatlan	Eduardo Quiñonez M	
El Sunza	Armenia	Arturo Arauno.	
El Trapiche	Santa Ana	Salvador Meran D	
El Trapichito	Suchitoto	J. M. Peralta	
La Cabaña	San Salvador	H. de Sola e Hijos	
La Finconia	Nahuilingo	Salvador López R.	
La Joya	San Salvador	José Trebaniano	
La Laguna	Puerto de La Laguna	Walter Deininger	14
La Labor	Ahuachapan	J. Antonio Salaverria	
López	Nahulingo, Sonsonate	Salvador López R.	
Los Lagartos	San Julian	L. Acuñer y Cia.	
Magdalena	Santa Ana	Vidri Hermanos	
Miramar	Zaragoza, La Libertad	R. Meyerhoffer & I.	
Omoa	El Porvenir	Suc. de Rodrigo Sacha	
Prusia	Soyapango	Ernst Melchers & Co	15
R. Gallardo	Chalatenango	Rodolfo Gallardo	
San Agustin	San Salvador	Roberto Meyer I.	
San Andres	Sitio del Niño	Dr. Francisco Duenas	7
San Antonio	Santa Ana	J. A. Martinez	
San Esteban	Chalatenango	Luis A. Bustamante	
San Francisco	Suchitoto	Meyer Hermanos	
San Isidro	Armenia	Cirilo A. Vda. de Regalado	
San Nicolas	Chalchuapa	Sara de Martinez	
Santa Emilia	Sonsonate	Santa Emilia C.	
Santa Isabel	Santa Tecla	José Pereira	
Santa Matia	San Agustin, Usulatan	R. Vivarez y Cia.	

Cuba

ALTHOUGH it is known that the sugar cane was brought to Cuba from Santo Domingo, the date of its introduction, as well as the location of the first sugar mill and the year of its erection, remains in doubt. It is known, however, that the establishment of sugar production as an industry took place in the closing years of the sixteenth century. During the next hundred years the cultivation of cane and the manufacture of sugar gradually spread through the island and by the year 1700 there were one hundred sugar plantations with an average production of about one hundred tons each.

In its early development the sugar industry of Cuba was built upon the foundation of slave labor, which resulted in the establishment of a great number of small mills with relatively slow progress in the adoption of mechanical equipment to replace hand and manual labor. This continued until 1872, when the movement for the liberation of slaves began, to be followed by the complete abolition of slavery in 1880. In 1870 there were some 1,200 mills in operation in Cuba producing a little over 700,000 tons of sugar, whereas twenty years later the number had been reduced to 470. Today the crop is turned out by less than 200 mills.

The abolition of slavery, replacing forced field labor by the colonial system of independent cane growers and encouraging the introduction of labor-saving machinery, brought about the modernization of the Cuban sugar industry, marked by the erection of large centrals. Just before the Spanish-American war, production reached 1,000,000 tons, but fell off to little more than 200,000 tons during that conflict. The great expansion in the industry began in 1903, when preferential tariff treatment was extended to Cuban sugar by the United States. With this great market opened to it on preferred terms, Cuban production rose from 1,000,000 tons in 1903 to 2,500,000 tons in 1913. During and following the world war the heavy demand from Europe added to that of the United States brought about a further increase to 4,000,000 tons in 1918 and to over 5,000,000 tons in 1925.

This marked the apex of production and under the stress of declining prices and efforts to limit the crop to levels that would insure a margin of profit to producers, the output declined to a little over 2,600,000 tons in 1932. In 1933, a production limit of 2,000,000 tons was fixed by decree. In 1934 and 1935 the authorized production was 2,315,000 tons, but actual production in 1935 was considerably in excess of this figure. In 1936, the crop limit was raised to 2,515,000 tons, in 1937 to 2,939,000 tons, and in 1938 to 2,950,000 tons.

The accompanying table shows in long tons (2,240 pounds) the production for each year from 1907 to date:

Year	Tons	Year	Tons
1907	1,451,963	1923	3,602,910
1908	984,045	1924	4,052,547
1909	1,558,078	1925	5,125,970
1910	1,804,439	1926	4,875,672
1911	1,483,451	1927	4,508,710
1912	1,895,984	1928	4,095,965
1913	2,428,537	1929	5,196,308
1914	2,551,119	1930	4,671,230
1915	2,582,845	1931	3,120,714
1916	3,006,624	1932	2,602,864
1917	3,019,936	1933	1,995,079
1918	3,444,605	1934	2,277,643
1919	3,967,094	1935	2,537,385
1920	3,128,975	1936	2,588,395
1921	3,935,433	1937	3,012,968
1922	3,966,189	1938	3,017,718

PRODUCTION OF CUBAN MILLS, 1935-1938

(Bags of 325 Pounds)

PINAR DEL RIO PROVINCE

Central	1935	1936	1937	1938
Andorra	89,408	86,925	96,631	87,205
Bahía Honda	47,614	62,625	75,320	69,324
El Pilar	86,122	112,404	142,307	132,349
La Francia	38,725	64,900	68,342	69,128
Mercedita (CA)	64,312	68,313	74,389	74,306
Niágara	33,272	50,551	38,608	55,475
Orozco	95,729	97,275	98,808	105,062
San Cristóbal	63,181	87,999	111,464	92,353
San Ramón	71,200	82,858	77,432	77,038
Total	589,563	713,850	783,301	762,240

HAVANA PROVINCE

Amistad	107,294	104,385	112,324	117,981
Fajardo	.....	34,424	37,777	33,707
Gómez Mena	208,953	183,329	192,279	198,783
Habana	70,952	70,399	77,756	77,912
Hershey	381,136	279,516	304,296	309,219
Josefita	.....	68,203	66,284	71,359
Mercedita	129,639	143,983	138,997	150,151
Occidente	38,752	34,042	43,643	47,408
Portugalete	60,300	52,553	54,871	60,248
Providencia	113,152	125,492	129,947	133,097
Rosario	82,218	93,632	108,583	137,569
San Antonio	74,744	85,370	99,194	133,975
Toledo	182,928	194,018	208,609	265,684
Total	1,450,068	1,469,346	1,574,560	1,737,093

MATANZAS PROVINCE

Central	1935	1936	1937	1938
Alava	108,032	141,005	168,566	177,564
Araujo	47,856	58,358	60,775	64,228
Australia	51,403	63,483	75,790	81,071
Carolina	48,845	52,845	56,647	59,434
Conchita	141,692	121,942	148,559	147,696
Cuba	281,435	270,178	293,937	282,887
Dolores	42,980	42,970	45,188	43,195
Dos Rosas	52,575	41,080	61,288	63,328
Elena	.....	22,122	25,295	24,744
España	264,125	227,526	252,136	247,333
Guipuzcoa	114,100	110,999	119,740	114,568
Limones	.....	.....	94,913	92,713
Mercedes	112,258	130,704	165,731	161,889
Porfuerza	114,930	95,980	126,633	128,174
Progreso	74,949	70,066	77,867	80,223
Puerto	.....	28,145	32,477	37,739
San Ignacio	42,589	48,946	56,671	57,471
Santa Amalia	.....	115,475	90,807	88,894
Santa Rita	51,052	58,327	50,010	47,763
Santo Domingo	97,000	86,660	94,461	107,973
Soledad (A & G)	57,940	62,412	72,950	76,180
Tinguaró	108,678	101,641	119,549	121,369
Triunfo	24,286	32,436	37,701	40,171
Zorilla	29,469	50,571	60,364	68,743
Total	1,866,195	2,033,871	2,388,055	2,415,550

SANTA CLARA PROVINCE

Central	1935	1936	1937	1938
Adela	77,924	72,401	83,511	82,872
Amazonas	50,244	46,208	59,195	57,906
Andréita	65,244	70,476	90,071	92,878
Caracas	104,709	114,014	132,391	140,406
Carmita			51,914	46,610
Constancia (CA)	66,107	76,658	81,853	114,400
Constancia (F)	50,977	100,415	89,750	77,640
Corazon de Jesús	78,264	43,636	92,239	109,721
Covadonga	121,724	119,319	149,875	155,382
Escambray	44,176	44,926	60,886	56,862
Fé			94,520	95,464
Fidencia			50,808	45,545
Hormiguero	123,974	132,437	140,668	136,877
La Vega		50,909	62,808	57,084
Macagua		23,560	49,971	65,841
Manuelita	94,000	98,062	136,030	124,962
María Antonia	12,280	34,243	55,002	61,639
Narcisa	64,848	122,155	133,504	134,221
Natividad	47,025	42,814	54,981	53,784
Nazábal	82,913	95,843	98,286	96,095
Nela	24,438	34,709	45,581	46,671
Parque Alto	16,000	34,705	49,821	39,478
Pastora	71,150	67,266	76,748	76,410
Perseverancia	122,794	118,799	133,029	144,634
Portugalete	71,962	63,370	75,057	73,668
Purio	8,805	39,604	66,572	62,632
Ramona	83,863	64,876	76,068	93,518
Reforma	125,803	204,538	111,283	102,679
Resolución		49,570	61,565	62,462
Resulta	156,514	122,924	111,208	111,667
San Augustín (L)	96,777	107,123	141,806	134,345
San Augustín (R)	97,209	83,722	96,713	94,145
San Francisco	47,880	63,045	69,180	63,330
San Isidro	105,514	90,103	103,204	112,467
San José	63,997	81,541	90,432	89,151
San Pablo		36,713	38,995	37,546
Santa Catalina			77,027	85,088
Santa Isabel	97,634	95,631	105,849	103,545
Santa Lutgarda	117,929	115,037	97,575	101,167
Santa María	104,730	74,059	85,293	99,168
Santa Rosa	85,057	105,189	94,020	93,706
Santa Teresa			109,193	92,399
Soledad (Atkins)	87,000	56,000	95,018	93,233
Trinidad	27,580	43,528	56,868	52,628
Tuinucú	143,706	127,754	145,489	144,606
Ulacia			27,749	85,572
Unidad		51,374	58,388	64,977
Vitoria	118,027	99,956	102,105	90,237
Washington	87,634	105,653	98,189	86,386
Zaza	83,026	73,270	78,163	75,605
Total	3,129,556	3,498,135	4,346,451	4,419,287

CAMAGUEY PROVINCE

Adelaida	202,010	144,742	157,070	146,851
Algodones	170,796	172,416	197,793	193,289
Baragua	286,291	279,448	314,525	308,992
Céspedes	44,537	151,107	150,077	148,151
Cunagua	238,197	222,095	228,211	217,126
Estrella	269,455	283,773	294,886	271,598
Florida	141,934	122,419	139,762	139,019
Francisco	537,428	537,978	547,548	541,415
Jaronú	469,093	373,819	456,457	446,511
Jatibonico	216,096	197,617	223,572	217,684
Lugareño	120,000	144,726	160,555	162,280
Macareño	118,042	101,202	120,104	115,598
Morón	350,000	348,926	357,924	362,925
Najasa		66,506	67,025	63,644
Patria	80,275	83,263	82,756	83,234
Punta Alegre	249,926	232,122	255,536	251,848
Santa Marta	137,024	125,758	152,450	143,259
Senado	221,339	213,850	198,457	195,139
Siboney	100,007	97,224	98,681	98,242
Stewart	513,010	548,325	404,405	531,747
Vertientes	541,181	475,497	570,112	548,378
Violeta	347,728	313,957	347,511	348,709
Total	4,946,041	4,758,870	5,135,720	5,055,445

ORIENTE PROVINCE

Algodonal	49,045	51,149	54,023	51,597
Almeida	135,752	116,731	145,650	134,754
Alto Cedro	151,078	154,625	225,519	216,740
América	113,411	96,151	115,965	115,852
Báguanos	126,299	139,111	146,621	147,029
Borjita		52,940	77,339	77,988
Boston	366,562	427,555	473,344	548,048
Cacocúm		34,218	41,095	37,304
Cape Cruz	86,884	91,286	105,451	93,961
Chaparra	505,531	279,655	503,931	511,562
Delicias	439,155	413,867	459,607	461,423
Dos Amigos				18,222
Ermita	115,000	93,985	102,986	104,998
Esperanza	100,021	88,340	103,485	99,617
Estrada Palma	92,980	65,568	88,118	90,951
Isabel (B)	107,782	111,538	115,337	112,819
Isabel (G)			60,442	55,945
Jobabo	160,032	218,923	183,103	179,961
Los Caños	115,000	110,108	117,514	116,819
Mabay	64,729	83,333	93,349	91,999
Maceo	70,507	93,552	81,229	79,983
Manatí	350,402	93,096	362,431	345,515
Miranda	257,075	189,749	250,602	249,968
Niquero	111,920	103,939	115,334	117,523
Ofelia			34,815	40,470
Palma	246,502	218,331	243,546	258,243
Preston	444,094	408,927	457,303	461,432
Río Cauto	131,000	105,944	119,543	117,922
Romelié	81,721	75,000	83,630	83,251
Salvador	21,340	33,761	44,078	40,112
San Antonio	73,698	68,535	79,308	81,881
San German	349,370	304,788	284,945	284,224
San Ramón			75,524	77,442
Santa Ana	144,429	128,529	139,882	140,425
Santa Cecilia	75,298	80,205	73,652	73,332
Santa Lucía	157,050	149,927	164,571	162,031
Sofía		22,421	34,929	22,412
Soledad Gran	93,320	81,865	108,031	111,924
Tacajo	131,488	131,442	151,050	148,313
Tanamo	179,344	160,527	185,208	181,171
Total	5,507,083	5,129,642	6,003,931	5,949,683
Grand Total	17,488,512	17,093,714	21,477,018	20,892,840

CUBAN SUGAR MILLS

PINAR DEL RIO PROVINCE

Central	Location	Owner	Manager	Capacity (Tons Cane per 24 Hrs.)
Andorra	Artemisa	Central Andorra, S. A.	Antonio Zubillaga Gorostiaga	2065
Bahia Honda	Bahia Honda	Cia. Azucarera del Noroeste, S. A.	Aurelio Soler	1560
El Pilar	Artemisa	Cia. Azucarera Pilar, S. A.	Edelberto Aurrecoechea	2790
*Galope	Galope	Cia. Agricola Manacas		1500
La Francia	Los Palacios	La Francia Sugar Co.	Pedro E. Cagigal	1950
Mercedita	Cabañas	Cuban American Sugar Co.	Philip Cooper	1780
Niágara	Con. del Norte	Cia. Azucarera Niágara	César Gutiérrez	890
Orozco	Cabañas	Orozco Sugar Co.	Jorge Alonso Patiño	1560
San Cristobal	San Cristobal	Cia. Azucarera San Cristobal, S. A. (Controlled by General Sugar Co.)	F. E. Couvillon	2200
San Ramón	Mariel	Central San Ramón, S. A.	Ramón Balsinde	1665

HAVANA PROVINCE

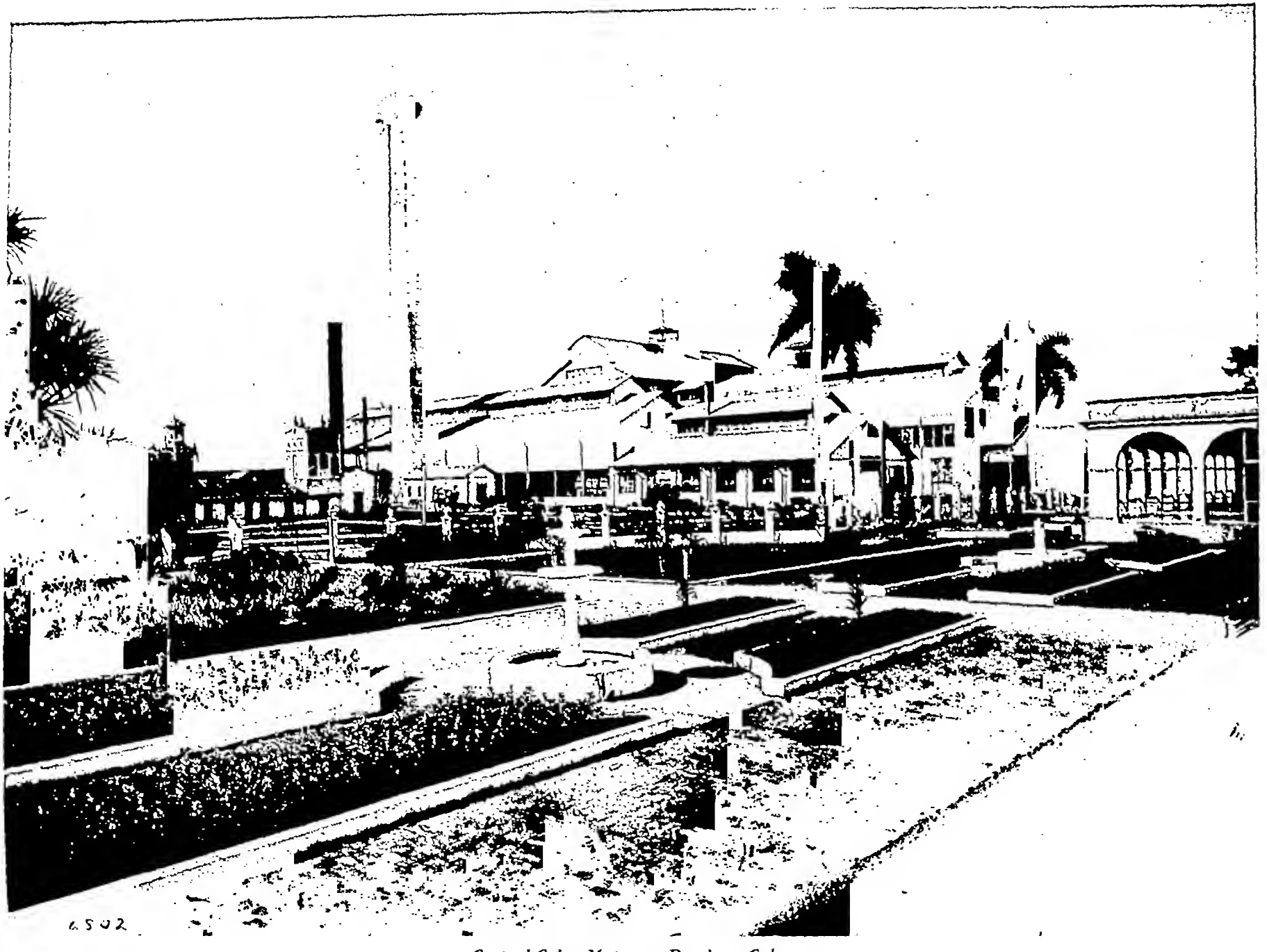
Amistad	Güines	Nueva Cia. Azucarera Gómez Mena, S. A.	Herminio García Rives	2560
Fajardo	San Antonio de los Baños	Cia. Azucarera Central Toledo, S. A.	Antonio Diaz Puig	835
Gómez Mena	San Nicolás	Nueva Cia. Azucarera Gómez Mena, S. A.	Obdulio Surós Reyes	1560
Habana	Caimito de Guayabal	Cia. Habana, S. A.	Antonio Rodríguez	1450
Hershey	Jaruco	Hershey Corporation, S. A.	P. A. Staples	7500
Josefita	Nueva Paz	Central Josefita, S. A.	Jose M. Martínez	1670
Mercedita	Melena del Sur	Nueva Cia. Azucarera Gómez Mena, S. A.	Alfredo Rodríguez Bernal	2775
Occidente	Quivicán	Cia. Azucarera Güiro Marrero, S. A.	Gonzalo Calvo	720
Portugalete	San José de las Lajas	Cia. Proprietaria del Central Portugalete, S. A.	José I. Aguirre	2000
Providencia	Güines	Cia. Azucarera de Güines	Jose Olagorta	2455
Rosario	Aguacate	Hershey Corporation, S. A.	Félix Orubeondo	1900
San Antonio	Madruga	Hershey Corporation, S. A.	W. A. Mace	2000
Toledo	Marianao	Cia. Azucarera Central Toledo	Salvador Santoyo	4350

MATANZAS PROVINCE

Alava	Banagüises	Atlantic & Gulf Sugar Co.	Andrés Calleja Capote	3500
Araujo	Manguito	Cia. Industrial Güedes, S. A.	Jose A. Güedes y Olano	2000
Australia	Jagüey Grande	Nueva Cia. Azucarera Australia, S. A.	Eudaldo del Valle	1785
Carolina	Coliseo	Cia. Azucarera de Guamacaro	Antonio Martínez	1555
Conchita	Alacranes	Atlantic & Gulf Sugar Co.	Juan Manuel Companería	3500
Cuba	Pedro Betancourt	Central Cuba Sugar Co.	Gerardo Fundora	4775
Dolores	Pedro Betancourt	Ingenio Dolores, S. A.	Aurelio Martínez	1100
Dos Rosas	Cárdenas	Hires Sugar Co.	Bauduy Lainé	1100
Elena	Canasí	Maria de las Angeles Grande Vda. de Solaón	Urtiaga y Arrieta	555
España	Perico	Ingenios Azucareros de Matanzas, S. A.	George T. Walker	6100
Guipúzcoa	Martí	Ramón y Alejo Gurruchaga y Arocena	Ramón Gurruchaga	2550
Limones	Limonar	Cia. Azucarera Limonar, S. A. (Arrendataria)	Francisco R. Gattorno	2775
Mercedes	Manguito	Atlantic & Gulf Sugar Co.	Ricardo Fernández Alvarez	3625
Porfuerza	Calimete	Cia. Agricola Indarra, S. A.	Fidel Barreto	2055
Progreso	Méndez Capote	Consolidated Sugar Company	José M. Vázquez	1780
Puerto	Canasí	Josefina Fernández Blanco Vda. de Avendaño	Juan Gronlier y Sardiña	666
San Ignacio	Agramonte	Central San Ignacio, S. A.	Manuel Garcia Herrera	1445
Santa Amalia	Carlos Rojas	Cia. Azucarera Coliseo, S. A.	Francisco R. Gattorno	1785
Santa Rita	Baró (Agramonte)	Municipio de Agramonte	Mario de Armas	1395
Santo Domingo	Unión de Reyes	Central Cuba Sugar Co., S. A.	Miguel Calvo	1665
Soledad	Jovellanos	Atlantic & Gulf Sugar Co.	Eligio Suárez	2000
Tinguaro	Perico	Cuban American Sugar Co.	Virgilio Costa	2945
Triunfo	Limonar	Jaime Marzol	Adolfo Marzol	1000
Zorrilla	Los Arabos	Cia. Azucarera Dulce Nombre, S. A.	José Durán y Fernández	1670

SANTA CLARA PROVINCE

Adela	Remedios	Cia. Azucarera Central Adela, S. A.	Juan Zárraga	1950
Amazonas	Sancti Spíritus	Cia. Agricola Sancti Spíritus, S. A.	Faustino S. A. de Chateauvieux	1555
Andreita	Cruces	Cia. Azucarera Central Andreita, S. A.	German Rivalta	2200
Carretas	Santa Isabel de las Lajas	Cia. Agricola Caracas, S. A.	Barrington Garnham	3300
Carmita	Vega Alta	Cia. Comercial "La Habana", S. A.	Germán S. López	1500
*Cienegüita	Abreu	Sucesión de Nicolas Castaño	Sotero Escarza	
Constancia	Abreu	Cuban American Sugar Co.	Roberto Echemendía	2200
Constancia	Encrucijada	Cia. Industrial Agricola de Encrucijada	Plácido D. Alvaré	2445
Corazón de Jesús	Sitiecito (Sagua)	Sra. Dolores Ramos Vda. de Gaye	Raúl Oquendo	1335
Covadonga	Carreño	Cia. Azucarera del Sur de Cuba	Pablo F. Carreño	2330
*Damuji	Palmira	Cia. Azucarera Jagua, S. A.	Enrique Monasterio	
*Dos Hermanos	Cruces	Cia. Financiera y de Valores, S. A.		1300
Escambray	Fomento	Escambray Sugar Co., S. A.	Elmer Kowalk	1225
Fé	Camajuani	Cia. Azucarera Central Fé, S. A.	Sebastian Zabelcta Errazquin	3350
Fidencia	Placetas	Cia. Azucarera Fidencia, S. A.	Domingo León Gonzalez	1445



Central Cuba, Matanzas Province, Cuba

Distillery	Location	Owner
Destiladora	Calle 12 y F, Reparto Batista, Havana	Compañia General Destiladora, S. A.
Gancedo	Acierto y Agua Dulce, Havana	Compañia Destiladora Gancedo, S. A.
Jaureguizar	Calle 12 y F, Reparto Batista, Havana	Isidoro Jaureguizar
La Vinatera	Arbol Seco y Desagüe, Havana	Compañia Importadora "La Vinatera", S. A.
Lugareño	*Lugareño No. 1, Havana	Compañia Destiladora Lugareño, S. A.
United	Avenida de Menocal 44½, Havana	United Distilleries Co.
	MATANZAS	
Alzola	4 a. y 7a., Cardenas	Alzola y Compañia
La Vizcaya	Calle 2 No. 15, Cardenas	José Arechabala, S. A.
San Juan	San Ambrosio No. 2, Matanzas	Compañia Destiladora San Juan, S. A.
San Nicolas	Calle 9 Nos. 95-97, Cardenas	Valentín Pérez Fariñas
Yucayo	Comercio No. 11, Matanzas	Eudoro Alba, S. A.
	SANTA CLARA	
Alambique	Central Nazabal, Encrucijada	Alambique Nazabal, S. A.
Compañia Azucarera Central Reforma	*Central Reforma, Caibarien	Compañia Azucarera Central Reforma, S. A.
Compañia Azucarera Cienfuegos	*Central Mascotta, Rodas	Compañia Azucarera Cienfuegos, S. A.
El Infierno	Avellaneda s.-n. Sagua la Grande	Compañia Destiladora, El Infierno, S. A.
P. A. Suarez Cordoves	*Central Maria, Yaguajay	P. A. Suarez Cordoves
Punta Majagua	Concha No. 12, Cienfuegos	Augustin Medina
San Carlos	Arango y Dorticos, Cienfuegos	Compañia Alcoholera San Carlos, S. A.
Villaclara	*Barrio Las Cañas, Santa Clara	Compañia Destiladora Villaclara, S. A.
	CAMAGUEY	
Cia. Licorera y Jabonera de Camagüey, S. A.	Finca Jagüey, Camagüey	Cia. Licorera y Jabonera de Camagüey, S. A.
	ORIENTE	
Alambique Holguin	Carretera Sur, Holguin	Compañia Alambique Holguin, S. A.
Alambique Marimón	*Central Almeida, Guantánamo	Pedro Almeida
Bacardi	San Pedrita s.-n., Santiago de Cuba	Compañia Ron Bacardi, S. A.
El Purgatorio	*Reparto Cespedes, Manzanillo	Jose Pañella
Genaro Fernandez	*Central San Ramon, Campechuela, Manzanillo	Vazquez y Compañia
Linares	Lorraine baja 30, Santiago de Cuba	Destilaria Linares
Quiroga	Carretera Bayamo, Manzanillo	Isdro Quiroga, S. A.
San Miguel	Central San Miguel, Guantánamo	Compañia Licorera de Guantánamo, S. A.
Santiago	Finca Sagarra, Santiago de Cuba	Rovira Y. Compañia
Sucesores de J. Alsina	*Central Sofia, Veguitas	Sucesores de J. Alsina
United Fruit Company	*Central Preston, Mayari	United Fruit Company

*Inactive.

Over-Quota Production of Cane and Invert Molasses in the 1937 Crop

Mills by Provinces	Over-Quota Cane Milled (Arrobas)	Invert Molasses Obtained (Gallons)	Per Cent in Gallons for 100 Arrobas of Cane Milled
	PINAR DEL RIO		
Mercedita	3,343,610	1,232,954	36.87
San Ramon	3,689,138	1,372,490	37.20
	7,032,748	2,605,444	37.05
	HAVANA		
Amistad	4,520,674	1,835,000	40.59
Gómez Mena	11,784,940	4,717,642	40.03
Herhsey	32,175,246	11,325,238	35.20
Josefita	1,565,316	616,000	39.40
Mercedita	12,426,155	4,942,080	39.77
Occidente	1,296,002	494,724	38.17
Portugalete	1,217,327	424,481	34.87
Providencia	12,116,071	3,141,732	56.83
Toledo	15,713,522	4,487,038	33.35
	92,813,253	31,983,935	36.69
	MATANZAS		
Alava	4,210,334	1,557,560	36.99
Carolina	4,027,477	1,482,058	36.80
Conchita	7,553,716	3,100,460	41.05
Cuba	15,363,314	6,156,028	40.07
Dos Rosas	1,604,820	543,787	33.88
España	14,151,135	5,438,220	38.43
Guipúzcoa	7,456,162	2,950,848	39.58
Progreso	4,597,914	1,817,146	39.52
Santo Domingo	7,720,362	2,947,763	38.18
	66,685,234	25,993,870	38.98
	SANTA CLARA		
Caracas	2,603,369	973,415	37.39
Nazábal	524,644	106,416	52.78
Parque Alto	2,841,372	1,019,424	35.88
Perseverancia	5,599,138	2,200,899	39.31
Portugalete	1,958,584	747,195	38.15
Ramona	4,566,750	1,802,118	39.46
San Agustin (L)	2,186,445	784,384	35.87
San Agustin (R)	4,667,090	1,837,629	39.37
	24,747,172	9,471,476	38.27

Mills by Provinces	Over-Quota Cane Milled (Arrobas)	Invert Molasses Obtained (Gallons)	Per Cent in Gallons for 100 Arrobas of Cane Milled
	CAMAGUEY		
Baragua	13,550,004	3,030,770	41.04
Cunagua	5,981,488	2,261,626	37.81
Florida	5,970,664	2,052,595	34.38
Francisco	7,635,179	2,923,205	38.29
Jaronú	22,487,674	8,497,092	37.79
Jatibonico	9,884,767	4,086,951	41.35
Lugareño	7,507,988	2,834,425	37.75
Marcareño	4,250,745	182,000	36.38
Morón	15,743,482	5,976,809	37.96
Najasa	4,494,626	1,855,000	41.27
Punta Alegre	3,912,716	1,612,531	41.21
Senado	28,082,250	10,818,949	38.53
Siboney	4,371,422	1,795,217	41.07
Violeta	9,576,284	3,478,552	36.32
	143,449,289	51,405,722	38.55
	ORIENTE		
Algodonal	249,368	113,337	45.45
Almeida	6,313,976	2,657,665	42.09
Alto Cedro	2,410,608	946,419	39.26
América	7,602,716	3,078,614	40.49
Báguanos	12,653,918	4,986,608	39.41
Boston	31,213,353	12,649,015	40.52
Chaparra	8,209,310	3,296,583	40.16
Delicias	14,518,087	6,082,059	41.89
Ermita	3,156,668	1,345,810	42.63
Manatí	4,107,584	1,567,992	38.17
Miranda	10,508,612	3,925,128	37.35
Palma	13,949,684	5,806,988	41.63
Preston	24,492,352	10,909,992	44.54
Rio Cauto	2,341,452	923,060	39.42
Romelie	457,254	150,384	33.25
San Germán	11,744,924	4,960,749	42.24
Santa Ana	4,988,968	2,035,168	40.79
Santa Lucía	18,456,848	6,641,992	36.01
Soledad	4,376,512	1,696,040	38.75
Tacajó	17,314,316	6,522,880	37.67
	199,061,510	80,296,485	40.34
TOTAL CUBA	535,789,206	201,756,930	38.92

British West Indies

DURING the eighteenth and the earlier part of the nineteenth centuries, when the demand for sugar was growing rapidly in Europe, the islands of the West Indies were the principal sources of supply. The United Kingdom was the most important of European markets and the British West Indies developed a thriving industry in supplying its needs. As in other parts of tropical America, the industry in its early years was founded on slave labor and the abolition of slavery in 1834 put the planters at a serious disadvantage in competing with the rising beet sugar industry of continental Europe. Free admission to the British market of this continental sugar supported by subventions in the producing countries caused the industry in the British colonies to stagnate. Sugar remains a chief industry, however, in Barbados, Trinidad, Jamaica, and some of the smaller islands, notably Antigua and St. Kitts; and some of the special grades of sugar produced in these colonies, such as Demerara crystals and West Indian grocery grades, retain their popularity with British consumers in spite of the competition of the products of the big refineries.

The production of sugar in tons of 2,240 pounds during the past twenty years has been as follows:

Year				
1918	65,230	84,500	40,255	45,[illegible]
1919	75,270	83,000	47,[illegible]	55,[illegible]
1920	84,[illegible]	40,[illegible]	80,[illegible]	81,[illegible]
1921	24,[illegible]	84,[illegible]	84,[illegible]	82,[illegible]
1922	30,230	42,[illegible]	80,[illegible]	72,[illegible]
1923	52,715	50,[illegible]	41,[illegible]	24,[illegible]
1924	44,110	84,[illegible]	52,[illegible]	22,[illegible]
1925	49,[illegible]	45,[illegible]	[illegible]	24,[illegible]
1926	47,[illegible]	[illegible]	[illegible]	[illegible]
1927	60,[illegible]	62,[illegible]	81,[illegible]	[illegible]
1928	54,[illegible]	63,[illegible]	83,[illegible]	43,[illegible]
1929	60,[illegible]	80,[illegible]	[illegible]	52,[illegible]
1930	60,[illegible]	[illegible]	[illegible]	47,[illegible]
1931	50,[illegible]	60,[illegible]	[illegible]	[illegible]
1932	83,[illegible]	88,[illegible]	[illegible]	48,[illegible]
1933	60,021	88,[illegible]	120,[illegible]	51,[illegible]
1934	82,934	72,[illegible]	108,[illegible]	55,[illegible]
1935	40,[illegible]	74,[illegible]	117,[illegible]	52,[illegible]
1936	103,[illegible]	91,[illegible]	154,[illegible]	61,[illegible]
1937	105,[illegible]	120,[illegible]	184,[illegible]	61,412
1938 (Est.)	100,000	120,000	130,000	75,000

JAMAICA

Mill	Location	Owner	Capacity (Tons Cane per 24 Hrs.)
Appleton	Siloah, St. Elizabeth	Lindo Bros. & Co., Ltd.	264
Bernard Lodge	Spanish Town, St. Catherine	Jamaica Sugar Mfg. Co., Ltd. (Subs. United Fruit Co.)	1020
Blue Castle	Savanna-la-Mar	West Indies Sugar Co., Ltd.	288
Bog Estate	Hayes P. O.	A. M. Pawsey & Bros.	200
Cambridge	Clark Town, Trelawny	H. R. Milliner	144
Catherine Hall	Montego Bay	Barnett Estate	216
Caymanas	Spanish Town	Caymanas Estates, Ltd.	500
Friendship	Petersfield, Westmoreland	West Indies Sugar Co., Ltd.	288
Frome	Grange Hill, Westmoreland	West Indies Sugar Co., Ltd.	600
Georgia	Duncans P. O.	Stewart Castle, Ltd.	170
Golden Grove	Golden Grove	Jamaica Sugar Estates, Ltd.	900
Gray's Inn	Annotto Bay	Gray's Inn (Jamaica) Central Factory, Ltd.	560
Green Park	Green Park, Falmouth	Walter Woolliscroft	250
Hampden	Hampden	C. M. Kelly-Lawson	240
Holland	Black River, St. Elizabeth	W. N. C. Farquharson	288
Innswood	Spanish Town	E. Charley	720
Ironshore	Little River P. O.	Ironshore Estates, Ltd.	60
Kew	Lucea, Hanover	G. P. Dewar & A. E. Muschett	288
Llandovery	Laughlands	Webb, Cotter & Paton	200
Long Pond	Clarks Town, Trelawny	Sheriff & Co. (Jamaica), Ltd.	360
Manningsfield	Race Course, Clarendon	Dr. B. J. A. Robinson	144
Masemure	Little London, Westmoreland	West Indies Sugar Co., Ltd.	384
Mercedes	May Pen, Clarendon	Grinan Estates, Ltd.	400
Mint	Grange Hill, Westmoreland	John Charley's Estate, Rec. London Merchants Bank	240
Monymusk	Alley, Clarendon	West Indies Sugar Co., Ltd.	510
Prospect	Green Island	West Indies Sugar Co., Ltd.	288
Raheen Estate	Black River	R. B. Daly, W. N. C. Farquharson and W. G. Hendricks	288
Retreat	Little London	W. H. C. Farquharson, F. H. Farquharson & W. P. Meany	240
Richmond	Laughlands	Estate of James Dougall	240
Rose Hall	Little River	J. & A. M. Henderson	250
Serge Island	Seaforth P. O.	Messrs. Seaforth Sugar & Rum, Ltd.	360
Shrewsbury	Petersfield P. O.	West Indies Sugar Co., Ltd.	25
United States	Bog Walk	Harold V. Lindo	300
Vale Royal	Duncans, Trelawny	G. P. Dewar, F. J. Constable Curtis and A. E. Muschett	250
Worthy Park	Ewarton, St. Catherine	Est. of F. L. Clarke	240

REFINERY

Name	Location	Owner	Capacity (Tons Cane per 24 Hrs.)
Monymusk	Alley, Clarendon	West Indies Sugar Co., Ltd.	20

ST. KITTS

Mill	Location	Owner	Capacity (Tons Cane per 24 Hrs.)
Basseterre	St. Kitts (Basseterre)	St. Kitts (Basseterre) Sugar Factory, Ltd.	2000

TRINIDAD

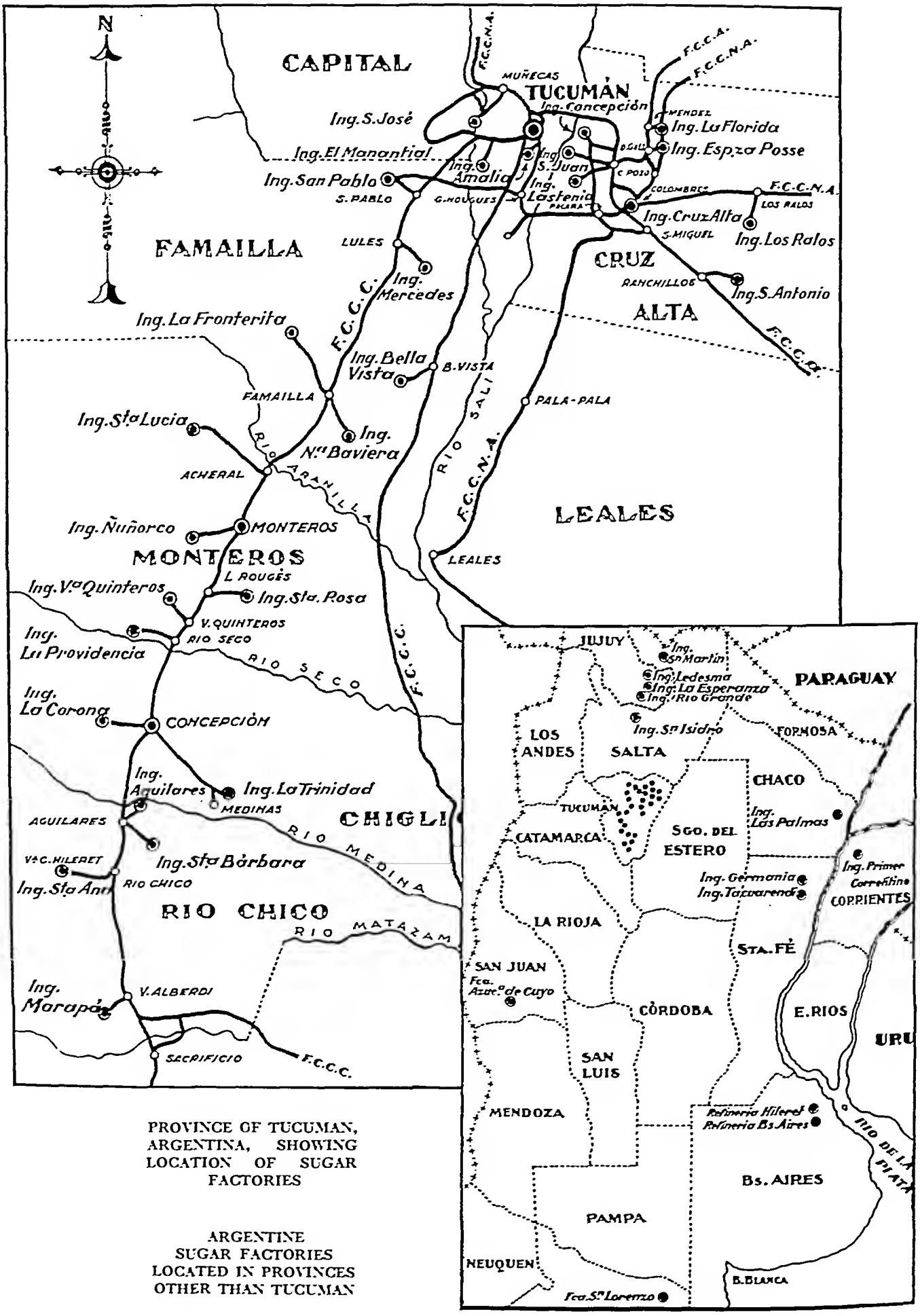
Mill	Location	Owner	Capacity (Tons Cane per 24 Hrs.)
Brechin Castle	Couva	Caroni Sugar Estates (Trinidad), Ltd.	700
Caroni	Caroni	Caroni Sugar Estates (Trinidad), Ltd.	1500
Craigmish	Princes Town	Connell Giteens	288
Esperanza	California	Gordon, Grant & Co., Ltd.	1200
Forrespark	Claxton Bay	Joseph B. Fernandes	235
Hindustan	Princes Town	D. A. G. Lawrie	200
*Imperial College	Imperial College	Imperial College of Tropical Agriculture	30
Orange Grove	Tacarigua	Trinidad Sugar Estates, Ltd.	900
Reform	San Fernando	Reform Estates 1928, Ltd.	360
Sainte Madeleine	San Fernando	Sainte Madeleine Sugar Co., Ltd.	3800
Waterloo	Carapichaima	Waterloo Estates, Ltd.	1800
Woodford Lodge	Chaguanas	Woodford Lodge Estates, Ltd.	150

*Instructional and research factory.

French West Indies

THE sugar industry of the French West Indian colonies of Guadeloupe and Martinique dates back to 1635, the year in which they were first occupied by the French, and during the middle part of the eighteenth century the sugar produced in these islands supplied the entire requirements of the mother country. While their relative importance in the industry has declined with the great rise of production in other parts of the world, sugar remains their principal industry. Production during the past ten years has ranged from 37,000 to 55,000 long tons annually in Martinique, and from 24,000 to 54,000 tons in Guadeloupe as shown by the appended table:

Year		
1929	[illegible]	[illegible]
1930	[illegible]	[illegible]
1931	[illegible]	[illegible]
1932	[illegible]	[illegible]
1933	[illegible]	[illegible]
1934	[illegible]	[illegible]
1935	[illegible]	[illegible]
1936	[illegible]	[illegible]
1937	[illegible]	[illegible]
1938 [illegible]	[illegible]	[illegible]



PROVINCE OF TUCUMAN, ARGENTINA, SHOWING LOCATION OF SUGAR FACTORIES

ARGENTINE SUGAR FACTORIES LOCATED IN PROVINCES OTHER THAN TUCUMAN

Brazil

THE sugar industry of Brazil dates back to the middle of the sixteenth century and before 1600 more than one hundred small mills were in operation. The industry gradually expanded until nearly 4,000 mills were built. Owing to the lack of modern transportation facilities, progress toward the concentration of milling in large centrals has proceeded much more slowly in Brazil than in many other sugar producing countries and cane is still crushed between wooden rollers in some parts of the country in mills that make low polarizing muscovados for local markets. There is also a larger number of small mills of modern type and in recent years several large factories equipped in the most up-to-date manner have been established.

Sugar is manufactured in nearly all the Brazilian states, but the leaders in production are Pernambuco in the north, and Rio de Janeiro and Sao Paulo in the south.

In common with other countries, sugar in Brazil suffered during the world economic crisis that set in about 1929 and the industry was faced with a problem of overproduction. This led to the establishment of a Sugar Defense Commission in 1931, which in 1933 was succeeded by the Sugar and Alcohol Institute, with comprehensive powers to regulate sugar production and prices. The Institute operates through an executive committee which includes representatives of the federal government, the Bank of Brazil, and the sugar producers. The Institute is financed by a tax on sugar production and has power to make loans, fix prices, and limit the output of sugar and alcohol. The encouragement of the production of alcohol for use as motor fuel is one of its main objects.

Owing to the character of the Brazilian sugar industry, and the great number of very small mills producing sugar for local use, exact statistics of output have been difficult to obtain. The Sugar and Alcohol Institute, however, has compiled production figures of the larger mills, or "usinas" from 1925-26 onward. The number of such "usinas" in 1935 was returned as 741, of which 296 operated for the production of sugar in the 1934-35 crop campaign. A number of others made alcohol only. In addition, there were 24,923 "engenhos," or small mills having neither centrifugals nor vacuum pans, many of which, however, made only rum or alcohol. The annual production from 1925-26 onward, as reported by the Sugar and Alcohol Institute and including the output of "usinas" only, is stated as follows in metric tons of 2,240 pounds:

Year	Tons	Year	Tons
1925-26	316,924	1931-32	549,417
1926-27	382,702	1932-33	524,747
1927-28	419,553	1933-34	542,975
1928-29	480,024	1934-35	762,474
1929-30	648,242	1935-36	1,013,591
1930-31	459,369	1936-37	895,500

According to estimates, more or less reliable, the total production, including the output of the "engenhos," during the same period ranged from 1,020,000 tons in 1929-30 to 650,000 tons in 1933-34, and for the last three years was: 1934-35, 762,474 tons; 1935-36, 1,013,591; 1936-37, 883,730, and 1937-38, 961,965.

Exports of sugar from Brazil reached their highest point in 1922, with 252,111 metric tons. Annual exports for a seven-year period were as follows: 1930, 84,456 tons; 1931, 11,096; 1932, 40,459; 1933, 45,058; 1934, 24,302; 1935, 86,892; 1936, 90,174.

STATE OF ALAGOAS

Factory	Municipality	Owner	Cane Capacity (Tons per 24 Hrs.)
Agua Comprida	Camaragibe	José Hortas Fernandes	238
Alegria	Murici	Pedro Cansanção & Cia	224
Bom Jesus	Camaragibe	Aristeu A. B. Cansanção	114
Brasileiro	Atalaia	Usina Brasileiro S. A.	1429
Camaragibe	Camaragibe	Osman Loureiro	235
Campo Verde	Murici	Usina Campo Verde S. A.	297
Cansanção de Sinimbú	São Miguel dos Campos	Usina Cansancão de Sinimbú	355
Capricho	Capella	Cicero Cabral Toledo	229
Conceição do Peixe	São Luiz do Quitunde	Climerio Wanderley Sarmento	
Coruripe	Coruripe	Usina Coruripe S. A.	318
Esperança	Murici	George L. Squier Mfg. Co.	134
João de Deus	Capella	José Octavio Moreira	87
Laginha	União	Usina Laginha S. A.	324
Leão	Utinga	Leão Irmaos	1466
Murici	Murici	Pedro Cansancão & Cia	43
Ouricuri	Atalaia	Manuel Tenorio De A. Lins	136
Pau Amarello	Sta. L. Norte	Squier Int. Corp	237
Peixe Grande	São Luiz do Quitunde	Enéas Coelho Pontes	234
Pindoba	São Luiz do Quitunde	João P. Costa Pinto	191
Porto Rico	Leopoldina	Ezequiel Siqueira Campos	247
Rio Branco	Atalaia	União Agriola S. A.	875
Sant' Anna	Porto Calvo	Democrito W. Sarmento	194
Santa Felisberta	Maragogy	Jorge Salles	30
Santo Antonio	São Luiz do Quitunde	S. Pragana & Cia	505
São Gonçalo	Porto de Pedras	Brasileiro Galvão & Cia, Ltda.	
São José	Atalaia	Abilio Leão da Cunha	
São Simeao	Murici	Lopes, Omena & Cia	330
Serra Grande	São José Lage	Usina Serra Grande S. A.	1247
Terra Nova	Pillar	Eunizio Medeiros	82
Uruba	Atalaia	Cia. Açucareira Alagoana	548

Factory	Municipality	Owner	Cane Capacity (Tons per 24 Hrs.)
Santa Alexandrina	João Pessoa	C. Regis & Cia., Ltda.	200
Sant' Anna	Santa Rita	Dr. Flaviano Rib. Coutinho	200
Santa Helena	Sapé	J. Ursulo & Irmãos	300
Santa Maria	Areia	S. A. White Martins	131
Santa Rita	Santa Rita	Usina Santa Rita S. A.	300
São Gonçalo	Santa Rita	J. Ursulo & Irmãos	240
São Joao	Santa Rita	J. Ursulo & Irmãos	600
Tanques	Alagoa Grande	Zenaide Holmes & Cia., Ltda.	180
STATE OF PERNAMBUCO			
Agua Branca	Quipapa	S. A. Cia. Agua Branca	460
Alliança	Alliança	Pessôa de Mello & Cia.	413
Aripibu	Amaragy	Pontual & Cia.	458
Bamburral	Amaragy	Davino dos Santos Pontual (Herdeiros)	280
Barra	Vicencia	Benjamin Azevedo	220
Barreiros	Barreiros	Herdeiros de Dr.Estacio Coimbra	1460
Bom Jesus	Cabo	J. L. de Siqueira Campos	661
Bulhões	Jaboatão	Pessôa Maranhão & Cia.	391
Cachoeira Lisa	Gamelleira	Dorotheu, Araujo & Cia.	800
Camorim Grande	Agua Preta	Motta & Irmãos	116
Capibaribe	São Lourenço	L. Araujo Irmão & Cia.	161
Catende	Catende	Usina Catende S. A.	1768
Caxangá	Ribeirão	Cia. Agric. & Industrial Usina Caxangá S. A.	702
Crauatá	Canhotinho	Viuva Motta & Filhos	120
Cruangi	Timbaúba	Andrade Queiroz & Cia.	422
Cucaú	Rio Formoso	Cia. Geral de Melhoramentos	955
Dois Irmãos	Quipapa	A. Cavalcanti & Irmão	120
Estrelliana	Ribeirão	João Wanderley Siqueira	425
Florestal	Marayal	Garcia & Carneiro da Cunha	286
Frei Caneca	Marayal	Silveira Barros & Cia.	729
Ipojuca	Ipojuca	Dourado & Monteiro, Ltda.	490
Jaboatão	Jaboatão	Antonio Martins Alburquerque	605
Jaguaré	Serinhaem	Oscar Cardoso da Fonte	240
José Rufino	Cabo	Viuva Hercilia V. Cavalcanti	298
Limoeirinho	Escada	Barão de Suassuna	239
Mameluco	Escada	Barão de Suassuna	630
Maria das Merces	Cabo	A. Cavalcanti & Cia.	655
Massaú-Assú	Escada	J. H. Carneiro da Cunha	752
Matary	Nazareth	Pessôa, Maranhaõ & Cia.	353
Meio da Varzea	Recife	Viuva Ignacio B. Barreto	
Morenos	Morenos	Antonio de Souza Leão	84
Muribeca	Jaboatão	Julio C. de A. Maranhão	661
Mussurepe	Pau d'Alho	Bandeira & Cia.	605
N. S. Auxiliadora	Morenos	João Dourado C. Azevedo	70
N. S. Desterro	Pau d'Alho	Alfredo C. Albuquerque	168
N. S. Maravilhas	Goyanna	Cia. Açucareira Goyanna S. A.	792
Olho d' Agua	Itambé	Hardmann, Tavares & Cia.	269
Pedrosa	Bonito	Siqueira Cavalcanti & Irmãos	530
Pery-Pery	Quipapa	Affonso Freire & Irmãos	300
Petribú	Floresta dos Leões	J. Cavalcanti de Petribú	391
Pirangy	Palmares	A. Gonçalves Ferreira, Jr.	246
Porto Alegre	Rio Formoso	José Accioli A. Da Silva	435
Porto Rico	Leopoldina	Ezequiel Siqueira Campos	
Pumaty	Palmares	Tancredo da Costa & Cia.	401
Regalia	Barreiros	Antonio Lopes F. Lima	85
Ribeirão	Ribeirão	Cia. Geral de Melhoramentos	840
Rio Una	Barreiros	A. F. Souza & Cia.	497
Roçadinho	Catende	Mendo Sampaio & Cia., Ltda.	519
Salgado	Ipojuca	Joaquim Bandeira & Cia.	1140
Sant' Anna Aguiar	Pau d'Alho	João Capitulino de Queiroz	280
Santa Flora	Itambé	Benjamin Nunes Machado	150
Santa Panfila	Victoria	F. R. Cavalcanti de Albuquerque	280
Santa Theresa	Goyanna	José Cezar & Cia.	599
Santa Therezinha	Agua Preta	Usina Santa Therezinha S. A.	1800
Santa Theresinha do Menino	Goyanna	M. Pessôa & Cia.	246
Santo André	Rio Formoso	Miguel Octavio de Mello	380
Santo Ignacio	Cabo	Brennand Irmãos & Cia.	530
São Felix	Gamelleira	Carolino Dias da Silva	104
São João	Varzea, Recife	M. C. do Rego Barros	1210
São José	Iguarassú	Bandeira & Irmão	458
Serra Azul	Palmares	Irmãos Gouvêa de Mello	458
Siberia	Cabo	Christiano S. A. Falção	229
Timbo-Assú	Escada	Belmiro Correa & Cia.	497
Tinoco	Serinhaem	Joaquim P. Abreu Lima	31
Tiúma	São Lourenço	Cia. Usina Tiuma S. A.	1687
Trapiche	Serinhaem	Mendes, Lima & Cia.	500
Tres Marias	Agua Preta	Sebastião Lucio Mergulhão	120
Treze de Maio	Palmares	Viuva Luzia Pedrosa	576
Ubaquinha	Serinhaem	Mendes, Lima & Cia.	286
União Industria	Frexeiras	Cia. Agr. União Industrial de Pernambuco	1300
Uruaé	Goyanna	Antonio Correa de Oliveira	109
STATE OF PIAUHY			
Sant' Anna	Therezinha	Gil Martins Ferreira	100
STATE OF RIO DE JANEIRO			
Abbadia	Campos	Francisco Vasconcellos S. A.	582
Barcellos	São João da Barra	Cia. Agricola Industrial Magalhães	928

Factory	Municipality	Owner	Cane Capacity (Tons per 24 Hrs.)
Belém	Itaporanga	Viuva Felisberto Freire	161
Bôa Luz	Laranjeiras	A. Franco Menezes	84
Bôa Sorte	Laranjeiras	José Sobral & Cia.	119
Bôa Vista	Espirito Santo	J. Francisco de Almeida	119
Cafuz	Laranjeiras	Adelia de Prado Franco	137
Camassari	Itaporanga	João Garcez	84
Cambuhy	Japaratuba	Osorio Vieira de Mello	113
Carahybas	Santo Amaro	Sabino, Ribeiro & Cia.	118
Castello	Santa Luzia	Cantidiano Vieira	172
Cedro	Santa Luzia	Alipio E. Lima	84
Central	Laranjeiras	Antonio F. Franco	600
Coração de Jesus	Riachuelo	Abilio Ezequiel de Barros	
Cruanha	Estancia	José Dionisio Soares	84
Cruzes	Japaratuba	Adolfo Mattos Telles	130
Cumbé	Rosario	Sobral & Irmãos	176
Cumbé	São Christavão	Pedro L. D. Nabuco	80
Escurial	São Christavão	Gonçalo de Faro Rollemberg	130
Espirito Santo	Riachuelo	Francisco R. Leite	126
Flor de Rio	Capella	Manoel Soares de Mello	101
Fortuna	Divina Pastora	Flavio Menezes do Prado	289
Itaperoá	São Christavão	Pedro Leal Bastos	109
Jaguaribe	Siriry	Affonso de Mello Prado	84
João de Deus	Capella	José Octavio Moreira	
Jordão	Maroim	Simeão M. A. Menezes	125
Jurema	Rosario	João Accioli de Faro	125
Lagoa Grande	Rosario	Passos & Irmãos	90
Lira	Riachuelo	Mario Menezes	
Lombada	Santo Amaro	Simeão Bastos Sobral	68
Lourdes	Divina Pastora	Adolfo Accioli Prado	290
Matta Verde	Siriry	João Gomes do Prado	80
Matto Grosso	Maroim	Gonçalo de Faro Rollemberg	230
Nazareth	Divina Pastora	Julio Accioli do Prado	106
N. S. Conseição	Santo Amaro	Mainart & Irmãos	95
N. S. Purificação	Capella	Ezequiel Almeida	84
Oitocentos	Rosario	J. Paes de Azevedo Sá	84
Outerinhos	Japaratuba	Gonçalo Rollemberg do Prado	337
Palmeira	Capella	Leonardo Machado	104
Paraiso	Laranjeiras	Gonçalo de Faro Dantas	119
Paty	Laranjeiras	Viuva Valentim Prado	101
Paty	Rosario	Celso Dantas & Irmãos	110
Paty	Siriry	Pedro Vasconcellos Prado	84
Pedras	Capella	Virgilio de Souza	110
Pedras	Maroim	Gonçalo Rollemberg do Prado	287
Pilar	Laranjeiras	Euripedes Muniz Freire	84
Porto dos Barcos	Riachuelo	Eduardo Vieira de Andrade	96
Priapú	Santa Luzia	Raimundo Menezes & Irmão	151
Proveito	Capella	Francisco Vieira de Andrade	172
Rio Branco	São Christavão	Heliodoro Vasconcellos Prado	339
Salobro	Divina Pastora	Miguel Accioli Faro	176
Santa Barbara	Rosario	Salustio Vieira de Mello	135
Santa Clara	Capella	Manoel R. da Cruz	137
Santa Cruz	Laranjeiras	J. Paes Silveira Madureira	84
Santa Maria	Riachuelo	Sobral & Garcez	119
Santa Maria	Siriry	Durval Barreto & Cia.	84
Santo Antonio	Santa Luzia	Alipio V. Menezes	109
São Carlos	Itaporanga	Silvio Sobral Garcez	109
São Diniz	Laranjeiras	Pedro Diniz Gonçalves	113
São Domingos	Siriry	J. Soares de Mello	
São Felix	Divina Pastora	J. G. Vieira de Mello	102
São Felix	Santa Luzia	Paulo Souza Vieira	125
São Francisco	Capella	Francisco X. de Andrade	270
São Francisco	Laranjeiras	Laffaiete Barros P. França	161
São João	Japaratuba	Viuva Manoel Dias Sobral	125
São João	Riachuelo	Manoel Santos Silva	168
São João Faleira	Laranjeiras	Arthur Alves Dos Santos	
São José	Laranjeiras	Adelia do Prado Franco	470
São José	Itaporanga	Cardoso & Irmãos	84
São José	Santa Luzia	Oscar Costa Leite	147
São José Cap. Assu	Rosario	Manoel Mainart	90
São José do Jardim	Japaratuba	J. Soares da Silva Mello	104
São José do Junco	Capella	Arnaldo Barros	140
São Luiz	Laranjeiras	Menezes & Filho	137
São Paulo	Riachuelo	Nestor Accioli de Faro	102
Sergipe	Laranjeiras	José Ottoniel Amado	147
Serra Negra	Rosario	Joaquim M. A. Menezes	200
Socorro	Socorro	Pedro Amado Montalvão	119
Soledade	Japaratuba	José Francisco M. Barreto	84
Tabúa	São Christavão	Anizio E. de Barros	102
Tijuca	Campo do Britto	Pedro Bastos Freire	30
Timbó	Japaratuba	Jovino de Andrade Vieira	78
Tinguí	Riachuelo	Theofilo F. Barreto	119
Topo	Japaratuba	José Faro Rollemberg	138
Trinidade	Espirito Santo	J. Santos Mendonça	78
Varzea Grande	Rosario	Manoel Vieira de Mello	137
Varzinha	Laranjeiras	A. Suadicani & Cia.	178
Varzinha	Siriry	Antonio Nunes Barroso	67
Vassouras	Divina Pastora	Adelina Vieira Dantas	247

BRITISH, DUTCH AND FRENCH GUIANA

SUGAR plantations in British Guiana are located along the seacoast or on low-lying lands along the rivers. One of the chief problems is that of drainage and the fields usually are diked and intersected by numerous drainage canals. Transportation is chiefly by water. Yields of sugar are not high but manufacturing methods are efficient and some of the sugar produced, especially the well known "Demerara crystals," commands a special market in the United Kingdom. Production is fairly stable as is shown by the accompanying figures of output, in tons of 2,240 pounds.

CHILE, COLOMBIA, ECUADOR AND PARAGUAY

SUGAR REFINERIES IN CHILE

Location	Owner	Capacity (Tons melted per 24 Hrs.)	Capacity (Liters Alcohol per 24 Hrs.)
Iquique	Soc. Francaise de Sucreries au Chili		
Iquique	Sucesion Luis Olmo		
Penco		120	10,000
Santiago	Gellona Hnos.		
Valdiva	Cia. de Refinería de Azucar Viña del Mar	40	
Viña del Mar	Cia. de Refinería de Azucar Viña del Mar	200	

SUGAR WASHING PLANTS

Santiago	Cia. Francesca de Azucar
Valparaiso	Cia. de Azucar de Valparaiso

SUGAR FACTORIES IN COLOMBIA

Factory	Location	Owner	Capacity (Tons Cane per 24 Hrs.)	Capacity (Liters Alcohol per 24 Hrs.)
Baltimore	La Mesa, Cundinamarca			
Belen	Palmira, Valle			
Bengala	Puerto Tejada, Valle	Arturo & Alicia Mejiá A.		
Berastegui	Cienaga de Oro, Bolivar	Empresa Azucarera de Berastegui, S. A.	1200	
Campoalegre	El Rosario, Santander N.			
Carrillo	Cucuta, Santander N.			
El Resumen	Cucuta, Santander N.			
La Industria	Florida, Valle	Francisco J. Caldas		
La Manuelita	Palmira, Valle	Ingenio Manuelita, S. A.		
La Paila	La Paila, Valle	Dr. Hernando Caicedo	1600	
La Providencia	Palmira, Valle	Central Azucarera de Valle		
Oriente	Palmira, Valle	Francisco Villegas M.		
Payande	Villeta, Cundinamarca			
San Antonio	Anapoima, Cundinamarca	Ingenio Central de San Antonio		
San Carlos	Tulua, Valle			
Sandona	Consaca, Nariño			
San Miguel	Sandona Nariño			
Sautatá	Rio Sucia, Choco	Empresa Sautatá	300	
Sincerin	Ariona, Bolivar	Colombian Sugar Co.	1250	4000

SUGAR FACTORIES IN ECUADOR

Factory	Location	Owner
Adelina María	Maridueña, Guayas	Herederos de V. Morla
Chonana	Santa Lucia, Guayas	Carlos Perez Noriega
El Condor	Yaguachi, Guayas	R. de Cevallos Santos & R. de Martinez
Ines Maria	Garaycoa, Guayas	Carrillo & Compañia
Luz Maria	Chobo, Guayas	Soc. Agr. Luz Maria
Rocafuerte	Milagro, Guayas	Juan A. Parodi
San Carlos	Maridueña, Guayas	Banco Comercial y Agr.
San Jose	Chote, Imbabura	Jijon Camaño
Santa Ana	Santa Lucia, Guayas	Enriqueta G. de Orrantia
Valdez	Milagro, Guayas	Cia. Azucarera Valdez
Virginia	Babahoyo, Los Rios	Herederos de Juan Jose Nuques

SUGAR FACTORIES IN PARAGUAY

Factory	Location
Azucarera Censi y Pirotti	Villa Hayes
Azucarera Felsina	Guarambare
Azucarera Jacobo Friedmann, S. A.	Villarica
Azucarera Guarambare, S. A.	Guarambare
Azucarera Nacional	Iturbe
Azucarera Naranjaty	Concepcion
Azucarera Paraguaya	Tebycuary
Azucarera Santa Rita	Villarica
Azucarera Segura Latorre	San Lorenzo

The Selby, York, Beet Sugar Factory of the British Sugar Corporation, Ltd.

EUROPEAN SUGAR PRODUCTION, 1928—1937

AUSTRIA (GERMAN AUSTRIA)

Year	Tons	Year	Tons
1928/29	107,321	1933/34	170,458
1929/30	120,390	1934/35	223,159
1930/31	150,269	1935/36	205,870
1931/32	162,550	1936/37	146,473
1932/33	164,899	1937/38	156,998

BELGIUM

Year	Tons	Year	Tons
1928/29	279,290	1933/34	247,017
1929/30	252,048	1934/35	269,877
1930/31	283,234	1935/36	236,709
1931/32	204,539	1936/37	239,541
1932/33	264,557	1937/38	239,981

CZECHOSLOVAKIA

Year	Tons	Year	Tons
1928/29	1,042,948	1933/34	511,927
1929/30	1,022,116	1934/35	630,659
1930/31	1,125,690	1935/36	558,216
1931/32	801,921	1936/37	709,652
1932/33	627,596	1937/38	738,288

DENMARK

Year	Tons	Year	Tons
1928/29	170,000	1933/34	254,000
1929/30	134,300	1934/35	90,340
1930/31	167,800	1935/36	244,800
1931/32	122,000	1936/37	226,200
1932/33	191,770	1937/38	251,000

FRANCE

Year	Tons	Year	Tons
1928/29	905,075	1933/34	937,587
1929/30	909,622	1934/35	1,217,073
1930/31	1,196,182	1935/36	913,789
1931/32	870,606	1936/37	870,283
1932/33	1,015,370	1937/38	965,024

GERMANY

Year	Tons	Year	Tons
1928/29	1,851,351	1933/34	1,446,485
1929/30	1,966,800	1934/35	1,693,113
1930/31	2,528,602	1935/36	1,668,533
1931/32	1,614,482	1936/37	1,803,784
1932/33	1,106,099	1937/38	2,215,000

HUNGARY

Year	Tons	Year	Tons
1928/29	220,062	1933/34	135,567
1929/30	246,831	1934/35	119,677
1930/31	234,171	1935/36	116,960
1931/32	125,251	1936/37	143,783
1932/33	103,410	1937/38	111,027

ITALY

Year	Tons	Year	Tons
1928/29	391,684	1933/34	303,369
1929/30	440,822	1934/35	349,557
1930/31	420,244	1935/36	320,689
1931/32	367,876	1936/37	333,834
1932/33	322,875	1937/38	348,778

JUGOSLAVIA

Year	Tons	Year	Tons
1928/29	128,840	1933/34	76,300
1929/30	131,743	1934/35	63,066
1930/31	98,288	1935/36	89,816
1931/32	88,980	1936/37	100,746
1932/33	85,883	1937/38	57,000

NETHERLANDS

Year	Tons	Year	Tons
1928/29	324,612	1933/34	293,698
1929/30	267,824	1934/35	246,117
1930/31	299,523	1935/36	229,389
1931/32	177,145	1936/37	237,141
1932/33	243,008	1937/38	246,445

POLAND

Year	Tons	Year	Tons
1928/29	756,889	1933/34	347,199
1929/30	928,776	1934/35	452,755
1930/31	791,948	1935/36	443,912
1931/32	499,275	1936/37	458,479
1932/33	422,148	1937/38	562,054

RUMANIA

Year	Tons	Year	Tons
1928/29	134,660	1933/34	144,510
1929/30	80,350	1934/35	107,394
1930/31	162,770	1935/36	134,573
1931/32	48,944	1936/37	71,842
1932/33	48,734	1937/38	75,676

SPAIN

Year	Tons	Year	Tons
1928/29	260,041	1933/34	260,222
1929/30	270,849	1934/35	372,007
1930/31	348,409	1935/36	217,342
1931/32	432,430	1936/37	266,747
1932/33	285,202	1937/38	182,000

SWEDEN

Year	Tons	Year	Tons
1928/29	160,860	1933/34	304,793
1929/30	121,404	1934/35	271,744
1930/31	186,535	1935/36	294,501
1931/32	143,611	1936/37	299,196
1932/33	235,351	1937/38	346,238

SOVIET UNION (RUSSIA)

Year	Tons	Year	Tons
1928/29	1,446,000	1933/34	1,219,041
1929/30	938,253	1934/35	1,478,303
1930/31	2,004,008	1935/36	2,609,300
1931/32	1,501,435	1936/37	1,998,943
1932/33	889,288	1937/38	2,300,000

Factory	Location	Owner
Hostačov	Hostačov	Rolnické cukrovary Hostačov a Zleby, akc. spol. ve Zlebech
Hrochův Týnec	Hrochův Týnec	Cukrovar v Hrochově Týnci, spol. s. rucenim obmezenym
*Klobuky	Klobuky v Čechách	Společný cukrovar v Klobukách
Kolin	Kolin	Společná továrna na cukr v Kolině
Kopidlno	Kopidlno	Cukrovar Ervina Schlika v Kopidlně
*Kostelec n. L.	Kostelec n. L.	Cukrovar a rafinerie Kostelec n. Lab. Neštěmické rafincrie cukru
Kouřim	Kouřim	Cukrovar v Kouřimi Hrusovanska raf. cuk. v Brně
Kralupy n. Vlt.	Kralupy n. Vlt.	Spolkový cukrovar rolnický v Kralupech, spol. s. rucenmi obmezenym
Krásné Březno (refinery)	Ústí III	Rafinerie cukru Krásné Březno, akciová spol. (Aktiengesellschaft d. Schoenpriesener Zuckerraffinerie)
Lenešice	Lenešice	Rolnický akcijni cukrovar v Lenešicich (Landw. Aktienzuckerfabrik in Lenešice)
Libáň	Libáň	Surovárna Libáň Neštěmické rafinerie cukru
Libochovice	Libochovice	Herbersteinsky cukrovar v Libochovicich
Litol	Lysá n. L.	Rafinerie cukru Krásné Březno, akciová společnost cukrovar v Litol
Louny I	Louny (Laun)	Lounský akciový cukrovar dr. M. Valtera
*Louny II	Louny (Laun)	Česká společnost pro průmysl cukerni, cukrovar a rafinerie v Lounech
Lovosice	Lovosice (Lobositz)	Rafinerie cukru v Krásném Brezné akc. spol., cukrovar Lovosice,
*Mělník	Mělník	Česká společnost pro průmysl cukerni, cukrovar a rafinerie v Mělníky
*Meziříčí	Meziříčí v Cechach	Cukrovar a rafinérie v. Meziříčí v Oskar Bondy
Mnichovo Hradiště	Mnichovo Hradiště	Cukrovary Schoeller a spol. akc. spol. cukrov. Mnichovo Hradiště
Mochov	Mochov	Česká společnost pro průmysl cukerni, cukrovar v Mochově
*Modřany	Modřany	Česká společnost pro průmysl cukerni, cukrovar a rafinerie cukru v Modřanech
Most	Most (Bruex)	Akciová společnost cukrovar v Mostě
Nový Bydžov	Nový Bydžov	Spolkový rolnický cukrovar v Novém Bydžově
Nymburk	Nymburk	Spolková cukrovarna v Nymburce
Ovčáry	Nový Dvur v K. Hory	Rolnický akciový cukrovar, pivovar, mlýn v Ovčárech
Pardubice	Pardubice	Akciový cukrovar Pardubicko-Moravansky
Plaňany	Plaňany	Společná továrna na cukr v Plaňenech
*Podzámčí	Podzámčí	Rolnický cukrovar, zemědělské a průmyslové podnicky akc. spol. v Podzámčí (Lndw. Zuckerfabrik, Oekonomie) (u. Industriebetriebes A. G. in Podzámčí)
Postoloprty	Postoloprty (Postelberg)	Ústecka rafinerie cukru akc. sp. cukrovar v Postoloprtech
Předměřice n. L.	Předměřice n. L.	Společný rolnický cukrovar v Předměřicich n. L.
*Přelouč	Přelouč	Porolničený cukrovar akciove spolecnosti v Preloučí
*Ratboř	Ratboř	Cukrovar v Ratboři Bernard Mandelik
Roudnice n. L.	Roudnice n. L.	Společný cukrovar podřipský v Roudnici n. L.
Rožďalovice	Rožďalovice	Rolnické akciové podniky, cukrovar a mlýn v Rozdalovicich
Skřivany (refinery)	Nový Bydžov	Skřivanská rafinerie cukru akciová společnost
*Slatiňany	Slatiňany	Cukrovar Slatiňany F. J. Auersperg
Smiřice	Smiřice	Státní cukrovar ve Smiřicich
Staré Benátky	Staré Benátky	Rafinerie cukru Krásné Březno, akc. spol. cukrovar Staré Benátky
Syrovátka	Dobrenice	Rol. cukrovar v Syrovátce akciová společnost
Štětí n. L.	Štětí n. L. Wegstädtl a. d. E.	Ústecká rafin. cukru, akc. spol. cukrovar ve Štětí n. L.
Toušeň	Toušeň-Lázne	Cukrovar v Toušeni Jakob Passer akc. sp.
Uhřiněves	Uhřiněves	Spolková rolnická továrna na cukr v Uhřiněvsi
Ústí n. L. (refinery)	Ústí n. L. (Aussig)	Ústecká rafinerie cukru, akc. spol. (Aussiger Zuckerraffinerie A. G.)
Užice	Užice	Surovárna Užice Neštěmické rafinerie cukru (Rohzuckerfabrik Užice der Nestomitzer Zuckerraffinerie)
Velvary	Velvary	Rafinerie cukru Krásné Březno akc. spol. cukrovar Velvary (A. G. der Schoenpriesener Zuckerraffinerie Zuckerfabrik Velvary)
Vinoř	Vinoř	Spolkový rolnický cukrovar ve Vinoři
Vlkava	Vlkava	Ústecka rafinerie cukru akc. spol. cukrovar ve Vlkavě
*Vrdy	Vrdy-Bučice	Cukrovary Schoeller akc. spol. cukrovar Vrdy
Vršovice (refinery)	Vršovice-Praha XIII	Vršovická rafinerie na cukr a syrup Kohn & Adler
Vrutice Kropáčova	Kropáčova-Vrutice	Česká společnost pro průmysl cukerni cukrovar ve Vrutici
Zdice	Zdice	Cukrovar ve Zdicich Oskar Bondy
Zvoleněves	Zvoleněves	Státní cukrovar ve Zvoleněvsi
Žatec	Žatec (Saaz)	Česká společnost pro průmysl cukerni, cukrovar v Žatci

MORAVIA

*Bedihošt	Bedihošt	Spolek moravských cukrovarů v Olomouci (Verein Maehrischer Zuckerfabriken, Olmuetz)
*Brodek	Brodek u Přerova	Rolnický cukrovar akciový v Brodku
*Břeclav I	Břeclav	Akciová společnost pro průmysl cukrovarnický
Bzenec-Mor. Pisek	Bzenec-Mor. Pisek	Akciová společnost pro průmysl cukrovarnický (A. G. fuer Zuckerindustrie)
Čelechovice na Hané	Čelechovice na Hané	Akciová společnost rolnického cukrovaru v Čelechovicich na Hané
*Chropyně	Chropyně	Chropyňský cukrovar, akciová společnost (Chropyner Zuckerfabriks A. G.)
Doloplazy	Nezamyslice	Doloplazsky cukrovar, akciova spolecnost (Doloplazyer Zuckerfabrik, A. G.)
Drahanovice	Drahanovice	Rol. akc. cukrovar v Drahanovicich
*Dřevohostice	Dřevohostice	Rolnický cukrovar akc. v Dřevohosticich
*Hejčín	Olomouc VI	Hejčínský cukrovar, lihovar a droždárna dříve Bratri A. & H. Mayů akc. spol. (Hejčiner Zucker-Spiritus-u. Presshefe-Fabrik vorm. Brueder A. & H. May A. G.)
*Hodonín	Hodonín	Akciová společnost pro průmysl cukrovarnický (A. G. fuer Zuckerindustrie)
*Holice u. Olom.	Holice u. Olomouce	Rolnický akciový cukrovar a rafinerie v Holici u Olomouce
*Hrušovany n. Jev.	Hrušovany n. Jev. (Grusbach)	Akciová společnost pro průmysl cukrovarnicky
*Hulín I	Hulín	Spolek moravských cukrovar, cukrovar v Huliné
Hulín II	Hulín	Rolnický cukrovar akciový v Huliné
Kelčany	Kelčany	Břeclavská rafinerie cukru akc. spol. Všetuly (Lundenburger Zuckerraffinerie A. G. Všetuly)
*Kojetín	Kojetín	Zborovicko-Kojetinské cukr. akc. spol. (Zborovic-Kojetiner Zuckerfabriken A. G.)

SUGAR REFINERIES IN FINLAND

Refinery	Location	Owner
Aura	Abo	Finska Socker Aktiebolaget (Helsingfors)
Jokioinen	Jokioinen	Jockis Socker-och Sirapsfabriks A. B.
Kotka	Kotka	Finska Socker Aktiebolaget
Tolo	Helsingfors	Finska Socker Aktiebolaget
Waasa	Waasa	Finska Socker Aktiebolaget

RAW SUGAR FACTORIES

Factory	Location	Owner
Salo	Salo	Suomen Raakasokeritehdas Oaskeyhtio
Antrea	Antrea	Suomen Raakasokeritehdas Oaskeyhtio

SUGAR FACTORIES IN FRANCE

Factory	Location	Owner
Abbeville	Abbeville	Société des Raffineries et Sucreries Say
Abscon	Abscon	Sucrerie d'Abscon
Aiseray	Aiseray	Société An. de la Sucrerie-Raffinerie de Chalon-sur-Saône
Artres	Artres	Soc. An. de la Sucrerie d'Artres, d'Haussy et Cie.
Attigny	Attigny	Soc. An. des Sucreries d'Attigny-Vouziers
Auffay	Auffay	Soc. An. Sucrière d'Auffay
Aulnois-sous-Laon	Aulnois-sous-Laon	Union Sucrière de l'Aisne
Beauchamps	Beauchamps	Société F. Béghin
Beaurain	Near Fresnoy-le-Luat	Soc. An. de la Sucrerie Agricole de Beaurain
Berneuil-sur-Aisne	Cuise-la-Motte	Soc. An. Sucrière de Berneuil-sur-Aisne
Bihucourt	Bihucourt	Lejosne et Cie.
Bohain	Bohain	Sucrerie de Bohain
Boiry-Ste-Rictrude	Boiry-Ste-Rictrude	Suererie Centrale d'Arras S. A.
Boistrancourt	Boistrancourt	Soc. An. de la Sucrerie de Boistrancourt
Bolbec-Nointot	Bolbec-Nointot	Sucrerie Agricole de Bolbec-Nointot, S. A.
Bourdon	Bourdon	Société de Bourdon
Bray-sur-Seine	Bray-sur-Seine	Société de Fabriques de Sucre
Brazey-en-Plaine	Brazey-en-Plaine	Sucrerie Bourguignonne et Chocolaterie A. Lanvin, réuniés, S. A.
Bresles	Bresles	Soc. An. des Sucrerie et Raffinerie de Bresles
Brienon-sur-Armançon	Brienon-sur-Armançon	Sucrerie-Raffinerie de Brienon
Bucy-le-Long	Bucy-le-Long	Soc. de Sucreries et Distilleries du Soissonnais, S. A.
Caudry	Caudry	Union Sucrière et Agricole du Cambrésis, S. A.
Chalon-sur-Saône	Chalon-sur-Saône	Soc. An. de la Sucrerie-Raffinerie de Chalon-sur-Saône
Château Thierry	Château Thierry	Soc. An. de la Sucrerie de Château Thierry
Chavenay	Chavenay	Soc. des Sucr. Francaises, S. A.
Chevrières	Chevrières	Duchêne et Cie.
Chevry-Cossigny	Chevry-Cossigny	Dufay et Cie., soc. en comm. p. a.
Colleville	Colleville	Sucrerie Agricole de Colleville, S. A.
Corbehem	Corbehem	Société F. Béghin Thumerier
Coudun	Coudun	J. Fantauzzi et Cie.
Coulommiers	Coulommiers	Soc. des Raffineries et Sucreries Say
Courrières	Courrières	Soc. An. des Suererie et Distillerie de Courrières
Courseulles-sur-Mer	Courseulles-sur-Mer	Société Sucrière du Calvados, S. A.
Crisolles	Crisolles	Suererie de Crisolles, Albert Poulin et Fils
Dompierre	Dompierre-en-Santerre	Sucrerie Centrale du Santerre
Epénancourt	Epénancourt	L. Boinet et Cie.
Eppeville-Ham	Eppeville-Ham	Comp. Nouvelle de Sucreries réuniés, S. A.
Erstein	Erstein	Soc. An. des Suereries et Raffineries d'Erstein
Escaudoeuvres	Escaudoeuvres	Sucr. Centrale de Cambrai, S. A.
Etaves-et-Bocquiaux	Etaves	Sucrerie Coopérative Agricole d'Etaves-et-Bocquiaux
Etrépagny	Etrépagny	Sucrerie Centrale d'Etrépagny, S. A.
Fins-Sorel	Fins-Sorel	Soc. Coop. Sucrière Agricole
Fismes	Fismes	Soc. de gérance pour l'exploitation de la sucrerie de Fismes. S. A.
Fontaine-le-Dun	Fontaine-le-Dun	Soc. An. Sucrière de Fontaine-le-Dun
Francières	Francières	Soc. An. des Sucrerie et Distillerie de Francières
Froyères	Froyères	Sucrerie de Froyères, S. A.
Goussainville	Goussainville	Soc. An. de la Sucrerie Agricole de Goussainville
Guignes-Rabutin	Guignes-Rabutin	M. Rivière
Guignicourt	Guignicourt	Sucr. Agricole de Guignicourt-sur-Aisne
Ham	Ham	Soc. Industrielle et Agricole de la Somme
Hornaing	Hornaing	Méjia-Démoutiez et Cie.
Iwuy	Iwuy	Sucrerie d'Iwuy, société à responsabilité limitée
La Nouville-Housett	Saint Richaumont	Compagnie Sucrière de la Nouville-Housett
La Nouville-Roy	La Nouville-Roy	Soc. An. de la Sucrerie Agricole de la Nouville-Roy
Lieusaint	Lieusaint	Soc. d'industries agricoles, sucrerie de Lieusaint
Lillers	Lillers	Sucr. coopérative de Lillers
Lizy-sur-Ourcq	Lizy-sur-Ourcq	Sucr. Agr. de Lizy-sur-Ourcq, S. A.
Longueil-Ste-Marie	Longueil-Ste-Marie	Soc. An. de la sucrerie-distillerie de Longueil-Ste-Marie
Maisse	Maisse	Soc. An. de la sucrerie coopérative agricole de Maisse
Maizy (Hautes-Rives)	Bourg-et-Comin	Soc. An. Sucrière Agricole de Maizy (Hautes-Rives)
Marconnelle	Marconnelle	Veuve Etienne Dalle, Sucrerie Hesdin
Marle-sur-Serre	Marle-sur-Serre	Compagnie Sucrière de Marle-sur-Serre
Masnières	Masnières	Sucreries Millet réuniés
Masny	Masny	Soc. An. de la Sucrerie de Masny
Mennecy	Mennecy	Rabier, Thirouin et Cie.
Mitry-Mory	Mitry-Mory	Sucrerie de Mitry. S. A.
Monchy-Humières	Monchy-Humières	Soc. An. de la Sucrerie de Monchy-Humières
Montcornet	Montcornet	Sucrerie de Montcornet, S. A.
Montereau	Montereau	Sucr. et Distilleries de Montereau, S. A.
Morigny-Champigny	Morigny-Champigny	Soc. An. de la Sucrerie Agricole Coopérative de Morigny

Factory	Location	Owner
Barum	Barum	Aktien Zuckerfabrik zu Barum
Bauerwitz	Bauerwitz	Zuckerfabrik Bauerwitz, G. m. b. H.
Bedburg	Bedburg	Zuckerfabrik Bedburg A. G.
Benkendorf	Benkendorf	Gebrueder Zimmermann
Bennigsen	Bennigsen	Aktien Zuckerfabrik Bennigsen
Bernstadt	Bernstadt in Schlesien	Zuckerfabrik Bernstadt G. m. b. H.
Bleckendorf	Bleckendorf	Zuckerfabrik Bleckendorf G. m. b. H.
Bockenem	Bockenem	Aktien Zuckerfabrik Bockenem
Brschwg.	Braunschweig	Aktien Zuckerfabrik Eichthal, Brschwg.
Brieg	Brieg	Zuckerfabrik Neugebauer, G. m. b. H.
Broistedt	Broistedt	Aktien-Zuckerf. Broistedt
Broitzem	Broitzem	Aktien-Zuckerf, Broitzem
Brottewitz	Brottewitz	Zuckerfabrik Mühlberg an der Elbe G. m. b. H. in Brottewitz
Bruehl	Bruehl-Koeln	Zuckerfabrik Bruehl A. G.
Burgdorf b. Braunschweig	Burgdorf b. Br.	Aktien-Reubenzuckerfabrik zu Burgdorf
Burgweide	Burgweide	Zuckerfabrik Schottwitz A. G.
Calbe a. S.	Calbe a. S.	Zuckerfabrik Calbe Werk II der Zuckerraffinerie Genthin A. G.
Clauen	Clauen	Clauener Aktien Zuckerfabrik
Dedeleben	Dedeleben	H. Schliephake & Co., Offene Handelsges.
Delitzsch	Delitzsch	Zuckerfabrik Delitzsch, G. m. b. H.
Demmin	Demmin	Zuckerfabrik A. G. in Demmin
Derenburg	Derenburg am Harz	Zuckerfabrik Derenburg Fr. Foersterling & Co., Offene Handelsges.
Dettum	Dettum	Zuckerfabrik Dettum Isensee & Co., Kom. Ges.
Dietzdorf	Dietzdorf	Zuckerfabrik Maltsch-Dietzdorf, G. m. b. H.
Dingelbe	Dingelbe	Dingelber Zuckerfabrik, G. m. b. H.
Dinklar	Dinklar	Zuckerfabrik Dinklar A. G.
Doebeln	Doebeln	Zuckerfabrik Doebeln A. G.
Dormagen	Dormagen	Pfeifer & Langen Koeln, Kom. Ges., Werk Dormagen
Droebel	Bernburg-Droebel	Zuckerfabrik Droebel G. m. b. H.
Dueren	Dueren	Schoeller Peill & Co., G. m. b. H.
Edderitz	Edderitz	Zuckerfabrik Edderitz, Offene Handelsges.
Egeln	Egeln	Aktien Zuckerfabrik Marienstuhl
Eilsleben	Eilsleben	Zuckerfabrik Eilsleben, G. m. b. H.
Einbeck	Einbeck	Carl Rabbethge u. Comp.
Elsdorf	Elsdorf	Pfeifer & Langen Koeln, Kom. Ges., Werk Elsdorf
Elsnigk	Elsnigk	Zuckerfabrik Elsnigk Strandes, Edeling & Co., Offene Handelsges.
Emmerthal	Emmerthal	Zuckerfabrik Emmerthal A. G.
Erdeborn	Erdeborn	Zuckerfabrik zu Erdeborn, Offene Handelsges.
Euskirchen	Euskirchen	Pfeifer & Langen Koeln, Kom. Ges., Werk Euskirchen
Fallersleben	Fallersleben	Akt. Zuckerf. Fallersleben
Fraustadt	Fraustadt	Zuckerfabrik Fraustadt A. G.
Friedberg	Friedberg in Hessen	Akt. Zuckerf. "Wetterau"
Friedensau-Limburgerhof	Friedensau	Sueddeutsche Zucker A. G., Werk Friedensau
Friedland	Friedland in Meckl.	Friedlaender Zuckerfabrik A. G.
Friedrichsthal	Friedrichstahl i. Pom.	Zuckerf Friedrichsthal, G. m. b. H.
Gatersleben	Gatersleben	Zuckerfabrik Gatersleben, G. m. b. H.
Genthin	Genthin	Zuckerraffinerie Genthin A. G.
Georgendorf	Georgendorf Steinau a. Oder	Zuckerfabrik Alt-Jauer, Werk Georgendorf
*Gernsheim	Gernsheim	Sueddeutsche Zucker A. G., Werk Gernsheim
Glauzig	Glauzig	Zuckerfabrik Glauzig A. G.
Goldbeck	Goldbeck	Akt. Zuckerfabrik Goldbeck
Gommern	Gommern	Zuckerfabrik Gommern, G. m. b. H.
Graeben-Striegau	Graeben-Striegau	Aktien-Zuckerfabrik Graeben
Greifenberg-Pommern	Greifenberg	Zuckerf. Greifenberg i. Pomm., G. m. b. H.
Groeningen	Groeningen	Wiersdorff, Hecker & Co., Offene Handelsges.
Gronau	Gronau i. Hannover	Gronauer Ruebenzuckerfabrik, G. m. b. H.
Gross-Duengen	Gross-Duengen	Zuckerfabrik Gross-Duengen A. G.
Gross-Gerau	Gross-Gerau	Sueddeutsche Zucker A. G., Werk Gross-Gerau
Gross-Mahner	Gross-Mahner (Salzgitter)	Zuckerfabrik Gross-Mabner Acbilles & Co. K.-G.
Gross-Munzel	Gross-Munzel	Akt. Zuckerfabrik Munzel-Holtensen
Gross-Neukirch	Gross-Neukirch	Zuckerfabrik des Kreises Cosel, G. m. b. H.
Gross-Osterhausen	Gross-Osterhausen	Zuckerfabrik Gross-Osterhausen, G. m. b. H.
Gross-Peterwitz	Gross-Peterwitz	Zuckerfabrik Gross-Peterwitz A. G.
Gross Twuelpstedt	Gross-Twuelpstedt	Akt. Zuckerfabrik Twuelpstedt.
*Gross-Umstadt	Gross-Umstadt	Zuckerfabrik Gross-Umstadt, G. m. b. H.
Guhrau	Guhrau	Zuckerfabrik Guhrau A. G.
Gutschdorf	Gutschdorf	Zuckersiederei Gutscbdorf, G. m. b. H.
Hadmersleben	Hadmersleben	Zuckerf. Hadmersleben, G. m. b. H.
Halberstadt	Halberstadt	Ferdinand Heine, Zuckerfabrik Halberstadt
Harsum	Harsum	Zuckerfabrik Harsum A. G.
Hasede	Hasede	Zuckerfabrik Hasede-Foerste A. G.
Haynau	Haynau	Aktiengesellschaft Zuckerfabrik Haynau
Hecklingen-Anbalt	Hecklingen	Zuckerfabrik Hecklingen, G. m. b. H.
Hedwigsburg	Hedwigsburg	Ruebenzuckerfabrik zu Hedwigsburg A. G.
Heidersdorf	Heidersdorf	Zuckerf. Heidersdorf G. m. b. H.
Heilbronn	Heilbronn a. Neckar	Sueddeutsche Zucker A. G., Werk Heilbronn
Helmsdorf-Gerbstedt	Helmsdorf	Zuckerfabrik Helmsdorf, G. m. b. H.
Hertwigswaldau-Jauer	Hertwigswaldau	Hertwigswaldauer Zuckerfabrik
Hessen	Hessen (Braunschweig)	Zuckerfabrik Hessen von Schwartz, Boetel & Co., K.-G.
Hessisch Oldendorf	Hessisch-Oldendorf	Zuckerfabrik Hessen-Oldendorf, G. m. b. H.
Hoetensleben	Hoetensleben	Zuckerfabrik Hoetensleben, G. m. b. H.
Hohenhameln	Hohenbameln	Hohenhameler Zuckerfabrik A. G.
Hornburg	Hornburg	Zuckerfabrik Hornburg, G. m. b. H.

Factory	Location	Owner
Schackensleben	Schackensleben	Zuckerfabrik Schackensleben, G. m. b. H.
Schellerten	Schellerten	Ashstedt-Schellerter Zuckerf, A. G.
Scheune bei Stettin	Scheune bei Stettin	Zuckerfabrik Scheune, G. m. b. H.
Schladen a. Harz	Schladen a. Harz	Zuckerfabrik Schladen A. G.
Schoenowitz	Schoenowitz bei Zuelz	Hotzenplotzer Zuckerfabriks, A. G., Subs.
Schoeppenstedt	Schoeppenstedt	Aktien-Zuckerf. Schoeppenstedt
Schottwitz-Breslau	Schottwitz	Zuckerfabrik Schottwitz A. G.
Sehnde	Sehnde	Aktien-Zuckerfabrik Sehnde
Soellingen	Soellingen	Zuckerfabrik Soellingen Kleye & Co., Offende Handelsges.
Soest	Soest	Zuckerfabrik Soest, G. m. b. H.
Stavenhagen	Stavenhagen	Zuckerfabrik Stavenhagen A. G.
Stendal	Stendal	Aktien-Zuckerfabrik Stendal
Stoebnitz	Stoebnitz	Zuckerfabrik Stoebnitz R. Bach & Comp., Offende Handelsges.
Stralsund	Stralsund	Zuckerfabrik Stralsund-Barth G. m. b. H.
Strasburg	Strasburg (Uckermark)	Uckermaerkische Zuckerf. A. G.
Straussfurt	Straussfurt	Zuckerfab. Straussfurt, G. m. b. H.
Stuttgart-Bad-Cannstatt	Stuttgart-Muenster	Sueddeutsche Zucker, A. G., Werk Zuckerfabrik Stuttgart
Tessin	Tessin i. Meckl	Zuckerfabrik Tessin, G. m. b. H.
Teutschenthal	Teutschenthal	Zuckerfabrik Teutschenthal Reussner & Co.
Thoeringswerder-Wriezen	Thoeringswerder a. O	Oderbruch Zuckerfabrik A. G.
Trachenberg	Trachenberg	Trachenberger Zuckersiederei A. G.
Uelzen	Uelzen	Aktien-Zuckerfabrik Uelzen
Vechelde	Vechelde	Aktien-Zuckerfabrik Vechelde
Vitzenburg	Vitzenburg a. d. Unstrut	Zuckerf. Vitzenburg, G. m. b. H.
Vossberg-Steintoch	Vossberg-Steintoch	Zuckerfabrik Vossberg Koppe & Co., K.-G.
Wabern	Wabern (Kassel)	Aktien-Zuckerfabrik Wabern
Waghaeusel	Waghaeusel	Sueddeutsche Zucker A. G., Werk Zuckerfabrik Waghaeusel
Wallwitz-Saalkreis	Wallwitz	Zuckerfabrik Wallwitz, G. m. b. H.
Walschleben	Walschleben (Erfurt)	Zuckerfabrik Walschleben, G. m. b. H.
Warburg	Warburg	Zuckerfabrik Warburg A. G.
Wasserleben	Wasserleben a. H.	Zuckerfabrik Wasserleben E. Henneberg & Co., Offende Handelsges.
Watenstedt	Watenstedt	Zuckerfabrik Watenstedt, Mueller & Co., K.-G.
Weetzen	Weetzen	Zuckerfabrik Weetzen, Warneke & Co., K.-G.
Weferlingen	Weferlingen	Zuckerf. Weferlingen, G. m. b. H.
Wegeleben	Wegeleben (Ostharz)	Wiersdorff, Meyer & Co., K.-G.
Weihendorf	Weihendorf	Weihendorfer Zuckerfabrik G. m. b. H.
Weizenrodau	Weizenrodau	Aug. Gross & Soehne, Offende Handelsges.
Wendessen	Wendessen	Zuckerfabrik Wendessen A. G.
Wevelinghoven	Wevelinghoven	Pfeifer & Langen Kom.-Ges. Zweigniederlassung Wevelinghoven
Wierthe	Wierthe (Braunschweig)	Aktien-Zuckerfabrik Wierthe
Wismar	Wismar i. Meckl	Zuckerfabrik Wismar Bock & Co., K.-G.
Wolmirstedt	Wolmirstedt	Friedrich Loss & Co., Offende Handelsges.
Worms	Worms	Zuckerfabrik Rheingau A. G.
Wulfen	Wulfen i. Anh.	Zuckerfabrik Wulfen Weste, Lampe & Co.
Zadel	Zadel in Schlesien	Zuckerfabrik Frankenstein, Werk III der Zuckerraffinerie Genthin A. G.
Zarkau	Zarkau	Zuckerfabrik Glogau, G. m. b. H., Zarkau-Glogau
Zeitz	Zeitz	Zuckerfabrik Zeitz, G. m. b. H.
Zoerbig	Zoerbig	Zuckerfabrik Zoerbig, G. m. b. H.
*Zuettlingen	Zuettlingen	Sueddeutsche Zucker A. G., Werk Zuettlingen

* Not operating

SUGAR REFINERIES

Refinery	Owner
Bergedorf	Milde & Hell, Bergedorf, Hamburg
Braunschweig	Zuckerraffinerie Braunschweig A. G., Braunschweig
Dessau	Dessauer Zuckerraffinerie, G. m. b. H., Dessau
Frankenthal	Sueddeutsche Zucker A. G., Werk Zuckerfabrik Frankenthal, Frankenthal (Pfalz)
Frellstedt	Norddeutsche Zuckerraffinerie A. G., Frellstedt
Genthin	Zuckerraffinerie Genthin A. G., Genthin
Halle a. S.	Zuckerraffinerie Halle, a. S.
Hamburg	H. J. Bruns, Koehlhofen 36, Hamburg
Hamburg	Heinrich Moeller, Grossmannstrasse 173, Hamburg
Hildesheim	Zuckerraffinerie Hildesheim, G. m. b. H.
Itzehoe	Zuckerraffinerie Itzehoe A. G., Itzehoe, Holstein
Leipzig	Sachsenroeder & Gottfried, Bluecherstr. 24, Leipzig
Luebeck-Stockelsdorf	Vereinigte Couleur-und Sirupfabriken J. J. Reinboth & J. L. F. Lau G. m. b. H., Stockelsdorf, Luebeck
Magdeburg-Neustadt	Walther Boye Nahrungsmittelwerke, Magdeburg-Neustadt
Magdeburg-Neustadt	Jacob Hennige Nachfolger Zuckerraffinerie, G. m. b. H., Magdeburg—Neustadt
Magdeburg-Sudenburg	Zuckerraffinerie Magdebnrg A. G., Magdeburg, Sudenburg
Meissen	Gebrueder Langeluetje, G. m. b. H.
Oberscheden	Chr. Wuestenfeld & Sohn K.-G., Oberscheden b. Hann.-Muenden
Rositz i. Thuer	Rositzer Zuckerraffinerie A. G., Rositz i. Thuer
Schweinfurt	Ad. Wuestenfeld & Co., A. G., Schweinfurt, Bayern
Stettin	Pommersche Provinzial-Zuckersiederei A. G., Stettin, Speicherstr.
Tangermuende	Zuckerraffinerie Tangermuende, Fr. Meyers Sohn A. G., Tangermuende
Uerdingen a. Rh.	Lüps & Melcher, Uerdingen a. Rhein
Uerdingen a. Rh.	Pfeifer & Langen, Kom. Ges., Werk Uerdingen a. Rhein
Vlotho a. W.	Ohle & Bonnemeyer, Vlotho a. W.
Vlotho a. W.	Gebrueder Tintelnot, Vlotho a. W.

SUGAR FACTORIES IN GERMAN AUSTRIA
(FORMER AUSTRIA)

Factory	Location	Owner
Bruck	Bruck a. d. Leitha	Oesterreichische Zuckerindustrie, A. G.
Duernkrut	Duernkrut	Leipnik-Lundenburger Zuckerfabriken A. G.
Hirm	Hirm (Burgenland)	Hirmer Zuckerfabrik A. G.

Factory	Location	Owner
Lendinara	Lendinara, Rovigo	Zuccherificio Lendinarese, Roma, S. A.
Littoria	Littoria, Roma	Società Italiana per l'Industria degli Zuccheri, Roma-Genova, S. A.
Mantova	Mantova	"Eridania" Zuccherifici Nazionali, S. A.
Massalombarda	Massalombarda, Ravenna	"Eridania" Zuccherifici Nazionali, S. A.
Mezzano	Mezzano, Ravenna	"Eridania" Zuccherifici Nazionali, S. A.
Migliarino	Ferrara tr. Padane	Zuccherificio del Volano, Genova, S. A.
Molinella	Molinella, Bologna	Società Saccarifera Lombarda, Milano, S. A.
Montagnana	Montagnana, Padova	"Eridania" Zuccherifici Nazionali, S. A.
Ostiglia	Ostiglia, Mantova	"Eridania" Zuccherifici Nazionali, S. A.
*Padova	Padova	Distilleria Italiana Zuccherificio di Padova
Parma	Parma	"Eridania" Zuccherifici Nazionali, S. A.
Piacenza	Piacenza	Società per Industria Commercio Agricoltura "Lauis", Rovello, S. A.
Polesella	Polesella, Rovigo	Società Saccarifera Lombarda, Milano, S. A.
Pontelagoscuro	Pontelagoscuro, Ferrara	Società Romana per la Fabbricazione dello Zucchero, Roma, S. A.
Pontelagoscuro	Ferrara	"Eridania" Zuccherifici Nazionali, S. A.
Pontelongo	Pontelongo, Padova	Zuccherificio e Raffineria di Pontelongo, Padova, S. A.
Porto Tolle	Porto Tolle, Rovigo	Zuccherificio Delta Po, Adria, S. A.
Rieti	Rieti, Roma	Società Italiana per l'Industria degli Zuccheri
Rovigo	Rovigo	Società Italiana per l'Industria degli Zuccheri
San Biagio	San Biagio, Ferrara	"Eridania" Zuccherifici Nazionali, S. A.
San Bonifacio	San Bonifacio, Verona	"Eridania" Zuccherifici Nazionali, S. A.
Sanguinetto	Sanguinetto, Mantova	Stabilimento Agricolo per la Lavorazione delle Barbabietole
*San Vito al Tagliamento	San Vito al Tagliamento, Udine	"Eridania" Zuccherifici Nazionali, S. A.
Sarmato	Sarmato, Piacenza	"Eridania" Zuccherifici Nazionali, S. A.
Sermide	Sermide, Mantova	Zuccherificio di Sermide, Genova, S. A.
Spinetta-Marengo	Spinetta-Marengo, Alessandria	Société Générale de Sucreries
*Viterbo	Roma	Zuccherificio Viterbese, Roma, S. A.

*Not operating

SUGAR FACTORY-REFINERIES

Factory-Refinery	Location	Owner
Avezzano	Avezzano, Aquila	Zuccherificio di Avezzano, Roma
Bologna	Bologna	Società Italiana per l'Industria degli Zuccheri, Genova-Roma, S. A.
Bondeno	Bondeno, Ferrara	Società Saccarifera Lombarda, Milano, S. A.
Casalmaggiore	Casalmaggiore, Cremona	Società Saccarifera Lombarda, Milano, S. A.
Cavanella-Po	Loreo Cavanella-Po, Rovigo	"Eridania" Zuccherifici Nazionali, S. A.
Este	Este, Padova	Società Veneta per l'Industria degli Zuccheri, Padova, S. A.
Ferrara	Ferrara	Zuccherificio e Raffineria Bonora, Ferrara
Foligno	Foligno, Perugia	Società Romana per la Fabbricazione dello Zucchero, Roma
Forlì	Forlì	"Eridania" Zuccherifici Nazionali, S. A.
Legnago	Legnago, Verona	Società Italiana per l'Industria degli Zuccheri, Roma-Genova
Migliarino	Migliarino, Ferrara	Zuccherificio del Volano, Genova, S. A.
Molinella	Molinella, Bologna	Società Saccarifera Lombarda, Milano, S. A.
Piacenza	Piacenza	Società per Industria Commercio Agricoltura "Lauis", Rovello, S. A.
Polesella	Polesella, Rovigo	Società Saccarifera Lombarda, Milano, S. A.
Pontelagoscuro	Pontelagoscuro, Ferrara	"Eridania" Zuccherifici Nazionali, S. A.
Pontelagoscuro	Pontelagoscuro, Ferrara	Società Romana per la Fabbricazione dello Zucchero, Roma, S. A.
Pontelongo	Pontelongo, Padova	Zuccherificio e Raffineria di Pontelongo, Padova, S. A.
Sampierdarena	Sampierdarena, Genova	"Eridania" Zuccherifici Nazionali, S. A.
San Vito al Tagliamento	San Vito al Tagliamento, Udine	"Eridania" Zuccherifici Nazionali, S. A.
Sermide	Sermide, Mantova	Zuccherificio di Sermide, Genova

SUGAR FACTORIES IN JUGOSLAVIA

Factory	Location	Owner
Beograd	Beograd	Državna Fabrika Šećera na Cukarici Beograd, State Sugar Factory
Branjin-Vhr.	Beli Manastir	Fabrika Šećera Drz. Dobra, Belje, State Sugar Factory
Crvenka	Crvenka	"Crvenka" Fabrika Šećera A. D.
Čuprija	Čuprija	Srpsko-Ceška Fabrika Šećera i Raffinerija A. D.
Novi Vrbas	Novi Vrbas	"Backa" Fabrika Šećera A. D.
Osijek	Osijek	Prva Hrvatskoslavonsko d. d. Za industriju Šećera
Stari Sivac	Stari Sivac	Proizvodjačka Šećera na A. D.
Veliki Bečkerek	Veliki Bečkerek	Veliko Bečkerečka Fabrika Šećera A. D.

SUGAR FACTORIES IN LATVIA

Factory	Location	Owner
Jelgava	Jelgava (Mitau)	Valsts Cukura Monopola Parvalde
Krustpils	Krustpils (Kreuzburg)	Valsts Cukura Monopola Parvalde
Liepaja	Liepaja (Libau)	Valsts Cukura Monopola Parvalde

SUGAR FACTORIES IN LITHUANIA

Factory	Location	Owner
Marijampole	Marijampole	Lietuvos Cukrus A. G. Kaunas Vytauto pr. 33
Pavenciai	Pavenciai	Lietuvos Cukrus A. G. Kaunas Vytauto pr. 33

SUGAR FACTORIES IN RUMANIA

Factory	Location	Owner
Arad	Arad	Fabrici si Rafinerii de Zahar din Romania, S. A.
Bălti	Bălti	Fabrika de Zahar Bălti
Bod	Bod	Fabrica de Zahar Bod, S. A.
Chitila	Chitila	Fabrici si Raffinerii de Zahar din Romania S. A.
Crisciatic	Crisciatic	Crisciatic S. A. pentru industria zaharului
Giurgiu	Giurgiu	"Danubiana" Fabrici si Rafinerii de Zahar Soc. Anon. Romana
Itcani	Itcani	"Itcani" Fabrica de Zahar S. A. R.
Jucica-Veche	Jucica-Veche	"Lujani" Fabrica de Zahar S. A. Bucuresti
Lujeni	Lujeni	"Lujăeni" Fabrica de Zahar S. A.
Ripiceni	Ripiceni	"Ripiceni" S. A. R. Fabrici si Rafinerii de Zahar
Roman	Roman	"Danubiana" Fabrici si Rafinerii de Zahar din Romania S. A.
Sascut	Sascut	"Danubiana" Fabrici si Rafinerii de Zahar din Romania S. A.
Târgu-Mures	Târgu-Mures	Fabrica de Zahar din Târgu-Mures, S. A.
Timisoara	Timisoara	Fabrica de Zahar din Banat S. A., Timis-Torontal (Friedorf)
Zarojani	Zarojani	"Zarojani" S. A. pentru industrii agricole

SUGAR FACTORIES IN SPAIN

BEET AND CANE SUGAR FACTORIES

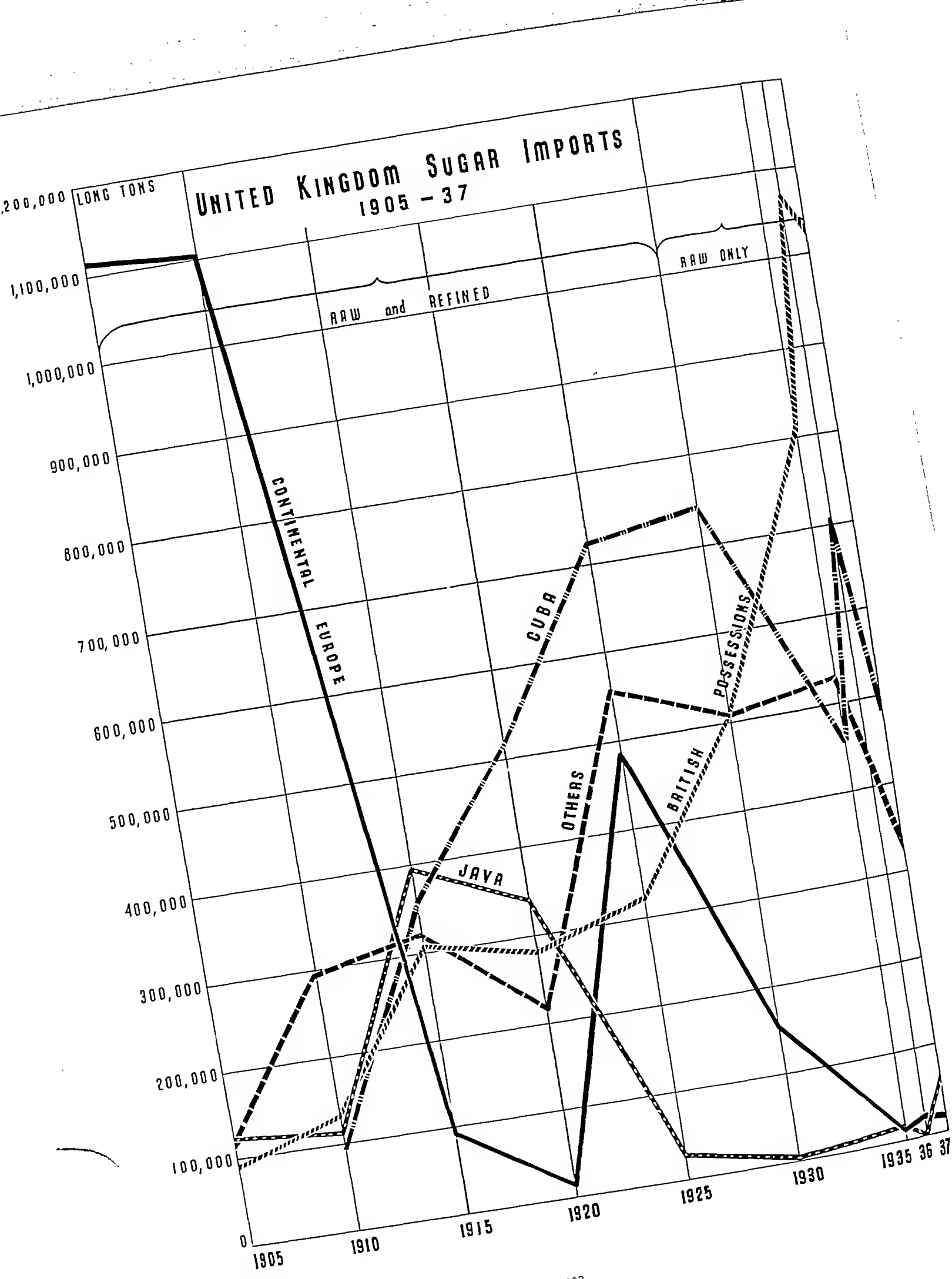
Factory	Location	Owner
Adra	Adra (Almeria)	Sociedad Cooperativa Azucarera de Adra
Málaga	Málaga (Málaga)	Azucarera Iberica S. A.
*Motril	Motril (Granada)	Azucarera Motrileña

BEET SUGAR FACTORIES

Factory	Location	Owner
Alagón	Alagón (Zaragoza)	Sociedad General Azucarera de España, Madrid
Alavesa	Vitoria (Alava)	Sociedad General Azucarera de España, Madrid
Alfaro	Alfaro (Logroño)	Cia. de Industrias Agricolas, Barcelona
*Aragón	Aragón (Zaragoza)	Sociedad General Azucarera de España, Madrid
Aranjuez	Aranjuez (Madrid)	Sociedad General Azucarera de España, Madrid
Arganda (Poveda)	Arganda (Madrid)	"Ebro" Cia. de Azucares y Alcoholes S. A., Madrid
Asturiana	Veriña (Oviedo)	Sociedad General Azucarera de España, Madrid
Bajo Aragón	Puebla de Hijar (Teruel)	Sociedad General Azucarera de España, Madrid
Calatayud	Calatayud (Zaragoza)	Sociedad General Azucarera de España, Madrid
Camiles de Baza	Baza (Granada)	Sociedad General Azucarera de España, Madrid
Carlos Eugui	Pamplona (Navarra)	Azucarera Carlos Eugui
Casetas	Casetas (Zaragoza)	Sociedad General Azucarera de España, Madrid
Castilla	Venta de Baños (Palencia)	"Ebro" Cia. de Azucares y Alcoholes S. A., Madrid
*Cortes	Cortes (Navarra)	"Ebro" Cia. de Azucares y Alcoholes S. A., Madrid
Gallego	Zaragoza (Zaragoza)	"Ebro" Cia. de Azucares y Alcoholes S. A., Madrid
Guadix	Guadix (Granada)	Sociedad General Azucarera de España, Madrid
Jalon	Epila (Zaragoza)	Sociedad General Azucarera de España, Madrid
Jiloca	Sta. Eulalia del Campo (Teruel)	Cia. de Industrias Agricolas, Barcelona
La Bañeza	La Bañeza (León)	Cia. de Industrias Agricolas, Barcelona
*Láchar	Yllora (Granada)	Sociedad General Azucarera de España, Madrid
La Rioja	Calahorra (Logroño)	Sociedad General Azucarera de España, Madrid
La Vega	Atarfe (Granada)	Azucarera Granadina La Vega
Leonesa	Veguellina (León)	Sociedad General Azucarera de España, Madrid
Leopoldo	Mirando de Ebro (Burgos)	"Ebro" Cia. de Azucares y Alcoholes S. A., Madrid
Luceni	Luceni (Zaragoza)	"Ebro" Cia. de Azucares y Alcoholes S. A., Madrid
Málaga	Málaga	Azucarera Iberica, S. A.
*Marcilla	Marcilla (Navarra)	Sociedad General Azucarera de España, Madrid
Monzon	Monzon (Huesca)	Compañia Azucarera Peninsular
Nueva Rosario	Pinos-Puente (Granada)	Azucarera Nueva Rosario
Pilar	Zaragoza (Zaragoza)	Sociedad General Azucarera de España, Madrid
Purisima Concepción	Granada (Granada)	Azucarera Purisima Concepción
Rinconada	Rinconada (Sevilla)	Azucarera Iberica S. A.
San Isidro	Granada (Granada)	Azucarera de San Isidro
San Fernando	Los Rosales (Sevilla)	Azucarera San Fernando
San José	Antequera (Málaga)	Ingenio San José
San Miguel	Sevilla	Betica A. G.
San Pascual	Zujaira (Granada)	Azucarera de San Pascual
*San Torcuato	Guadix (Granada)	Sociedad General Azucarera de España, Madrid
Santa Victoria	Valladolid (Valladolid)	Azucarera Santa Victoria
*Segre	Menarguens (Lérida)	Sociedad General Azucarera de España, Madrid
Terrer	Terrer (Zaragoza)	"Ebro" Cia. de Azucares y Alcoholes S. A., Madrid
Tudela	Tudela (Navarra)	Azucarera Agricola Industrial Navarra

CANE SUGAR FACTORIES

Factory	Location	Owner
*Carmen	Almuñecar (Granada)	Azucarera del Carmen. Plandiura y Carreras
El Carmen	Frigiliana (Málaga)	Azucarera El Carmen
La Melcochera	Lobres (Granada)	Enrique Montero Lopez
N. S. del Carmen	Motril (Granada)	Azucarera Nuestra Señora del Carmen
N. S. del Pilar	Motril (Granada)	Sociedad General Azucarera de España, Madrid
N. S. Rosario	Frigiliana (Málaga)	Azucarera Nuestra Señora del Rosario
*N. S. Victoria	Almuñecar (Granada)	Azucarera Nuestra Señora de la Victoria
Otivar	Otivar (Granada)	Azucarera Nuestra Señora del Carmen
Otivar	Otivar (Granada)	Azucarera San José
*Purisima Concepción	Granada (Granada)	Azucarera de la Purisima Concepción


UNITED KINGDOM SUGAR IMPORTS
1905 – 37
LONG TONS
1,200,000
1,100,000
1,000,000
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
RAW and REFINED
RAW ONLY
CONTINENTAL EUROPE
CUBA
POSSESSIONS
OTHERS
BRITISH
JAVA
1905
1910
1915
1920
1925
1930
1935 36 37

UNION OF SOVIET SOCIALIST REPUBLICS

LIKE all other industries, the sugar industry in the Soviet Union is a state monopoly. Russian sugar production was reduced to a low ebb during the World War and the revolutionary disturbances which followed it, and the Soviet government had to undertake the double task of reorganizing the industry on collectivist principles and at the same time restoring its former productiveness. This to a large degree has been effected by means of the programs laid down under the so-called first and second Five Year Plans. Sugar production, which in 1923-24 fell as low as 512,314 metric tons, has been brought up to 1,210,041 tons for 1933-34, 1,478,303 tons for 1934-35, 2,609,300 tons for 1935-36, and an estimated 2,500,000 tons for 1937-38.

The organization of the sugar industry has undergone repeated changes under the Soviets, but the principle of state control has been maintained. By the latest reorganization the industry has been placed under the Commissariat of Food Industry and is known as the Glavsakhar (Sugar Administration). The Glavsakhar is subdivided into ten regional sugar trusts (Sakharotrests): Kiev, Vinnitza, Kharkov, Kursk, Odessa, Tchernigov, Voronezh, Moscow, Alma-Ata, and Siberian. The first nine of these trusts have their headquarters in the cities of the same names. The headquarters of the Siberian trust are at Barnaul. There are also regional trusts (Sveklotrest) for growing sugar beets. These are federations of the Soviet farms (Sovkhozi). Beets are also grown under contracts on collective farms (Kolkhozi) which are not operated by the trusts.

SUGAR BEETS WORKED
(Millions of Quintals)

1924	32.5	1930	129.5
1925	81.0	1931	100.6
1926	61.3	1932	58.3
1927	94.5	1933	78.1
1928	92.8	1934	93.2
1929	58.3	1935	157.9
	1936	168.3	

The Kharkov, Kiev, Kursk, Tchernigov and Odessa trusts comprise the factories in the Ukraine, which was the great beet sugar producing region of old Russia. The Voronezh trust comprises a number of factories in the so-called Central Black Soil region, northeast of the Ukraine. Besides rebuilding the sugar industry in these regions, the Soviet government has devoted considerable attention to developing new areas of sugar beet culture and beet factories have been erected or are planned for erection in the Middle and Lower Volga Regions, the Northern Caucasus, Transcaucasia, Kirghizia, Kazakstan and other sections of western Siberia, and in the far eastern part of Siberia.

The industry sunk to a low point in 1921-22, when its production was only 3.8 per cent of its pre-war amount. Recent large capital investments have stimulated the building of new factories. Appropriations were 22,000,000 paper roubles ($4,400,000) in 1933 and double that in 1935. Improved agricultural technique has brought hydraulic transporters for beets, mechanical ejectors for the pulp, and tractors and automobiles to replace the peasants' carts. Yields of both collective farms and trusts have increased from 70-80 metric centners (7 to 8 metric tons) per hectare to 300-400 metric centners (30 to 40 metric tons). There is an ample supply of beets, as well as fuel, lime, and other materials. There were 115,731 workers engaged in the industry in 1937.

The following areas (in thousands of hectares) were sown to sugar beets for refineries: 1928: 769.7; 1932: 1,537.8; 1933: 1,210.7; 1934: 1,183.3; 1935: 1,225.1; 1936: 1,272.4; 1937: 1,190.

	Imports (Metric Tons Raw Value)	Exports
1929-30	326,250	150,000
1930-31	120,000	360,700
1931-32	46,695	130,215
1932-33	7,644	67,116
1933-34	12,687	47,424
1934-35	285	79,640
1935-36	451	122,693
1936-37	127	198,563

In recent years, a large amount of Soviet sugar beet seed has been exported to beet-growing countries throughout the world.

According to the latest figures available, the number of working sugar factories in the Soviet Union in 1937 was 189, of which 70 per cent were situated in the Ukraine and 27 in the Central Black Soil region. Factories building or projected number 24, some of which will not get into operation until 1938. The accompanying list gives the names of the factories and refineries operated by the different trusts, and also data concerning those under construction.

SUGAR FACTORIES IN THE SOVIET UNION

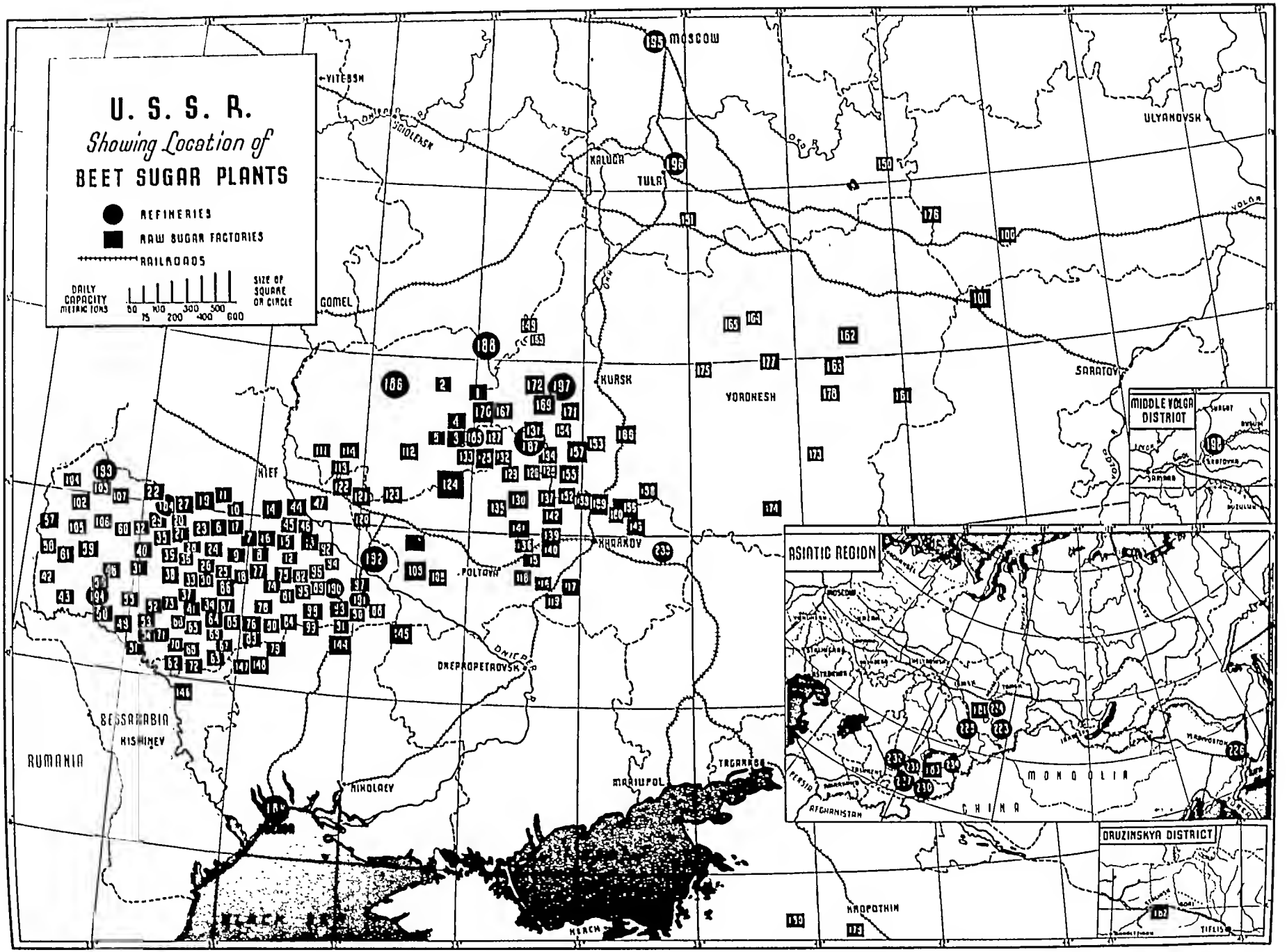
KHARKOV SUGAR TRUST

Factories

Ananjevsk
Artimievsk
Chalturinsk
Globinsk
Griasniansk
"Ilyitch"
Kashperovsk
Komsomolsk
Krasnoe Armeisk
Kujanovsk
Leninsk (Zieglerovsk)
Miesenovsk
Murafsk
Nisovsk
Novo Ivanovsk
Nravdinsk
Obodovsk
Oktjabirsk
Parchomovsk
Pervuchinsk
Petrovsk (First)
Pivnenkovsk
Pravdinsk
Shramkovsk
Skrinnikovsk
Sovietsk
Stalinsk
Sumsko-Stepanovsk
Tchubarevsk
Tchupachovsk
Ternovsk
Ugrojedsk
Veliko Oktjabirsk
Veslolo Podolsk
Vosroshdenie
Zemetchinsk

Refinery

Krasnosvesdensk


U. S. S. R.
Showing Location of
BEET SUGAR PLANTS
REFINERIES
RAW SUGAR FACTORIES
RAILROADS
DAILY CAPACITY METRIC TONS
50 100 300 500
15 200 400 600
SIZE OF SQUARE OR CIRCLE
MOSCOW
YITEBSK
SMOLENSK
KALUGA
TULA
ULYANOVSK
GOMEL
KURSK
YORONESH
SARATOV
KIEV
KHARKOV
POLTAVA
DNEPROPETROVSK
DNIEPER
BESSARABIA
KISHINEV
RUMANIA
NIKOLAEV
MARIUPOL
TAGANROG
KRASNODAR
KERCH
BLACK SEA
MIDDLE VOLGA DISTRICT
ASIATIC REGION
MONGOLIA
CHINA
AFGHANISTAN
PERSIA
DRUZINSKYA DISTRICT
TIFLIS

Africa

EGYPT

THOUGH sugar cane may have been grown in the valley of the Nile at an early date, the sugar industry of Egypt was a development of the latter half of the nineteenth century. The first mill was built in 1858 but it was ten years later before the systematic development of the industry took place under the direct encouragement of the first Khedive Ismail. In 1891, a refinery was built at Hawamdieh. In 1897, the Société Générale des Sucreries et de la Raffinerie d'Egypte was organized under the direction of M. Cronier and consolidated all the Egyptian sugar establishments in one organization. Production in Egypt during the past ten years has been as follows in tons of 2,240 pounds:

Year	Tons	Year	Tons
1928-29	98,000	1933-34	151,593
1929-30	90,000	1934-35	136,546
1930-31	120,000	1935-36	131,879
1931-32	144,362	1936-37	137,908
1932-33	168,251	1937-38 (Est.)	146,000

SUGAR MILLS IN EGYPT

Location	Owner
Abou-Kourgas	Société Générale des Sucreries et de la Raffinerie d'Egypte, Cairo
Cheikh Fadl	"
Ermant	"
Kom-Ombo	"
Nag-Hamadi	"

SUGAR REFINERY

Location	Owner
Hawamdieh	Société Générale des Sucreries et de la Raffinerie d'Egypte, Cairo

SUGAR FACTORIES IN PORTUGUESE AFRICA

PROVINCE OF MOZAMBIQUE

Location	Owner
Inhaguvo	Companhia Colonial do Buzi
Inhambane	Musamba Sugar Estates, Ltd.
Lourenço Marquês	Incomati Sugar Estates, Ltd.
Luabo	Sena Sugar Factory, Ltd.
Maave	Companhia Colonial do Buzi
Mopeia	Sena Sugar Factory, Ltd.
Mossomeu	Sena Sugar Factory, Ltd.
Movene	African Agricultural Estates, Ltd.
Villa Fontes	Sena Sugar Factory, Ltd.

PROVINCE OF ANGOLA

Location	Owner
Alto Dande (Fazenda "Tentativa")	Companhia do Assucar de Angola
Bom Jesus	Companhia Agricola do Cazengo
Cassequel	Sociedade Agricola do Cassequel
Conceição Pinto	Antonio do Couto Pinto
Dombe Grande	Companhia do Assucar de Angola
Novo Redondo	Companhia Quanza do Sul
Novo Redondo	Valentin Pires Leiro

BELGIAN CONGO SUGAR FACTORY

Location	Owner
Moerbeke-Kwilu	Campagnie Sucrière Congolaise

SUGAR FACTORIES IN MADAGASCAR

Location	Owner
Tamatave	Compagnie Agricole et Industrielle de Madagascar, S. A.
Tamatave	Amode Khan & Fils
Tamatave	Edgar Payet
Dzamandzar (Nossi-Be)	Compagnie Agricole et Sucrière de Nossi-Be, S. A.
Anjounan, Comoro Is.	Soc. Coloniale de Bambao

SUGAR REFINERY IN MOROCCO

Location	Owner
Casablanca	Compagnie Sucrière Marocaine

SUGAR FACTORIES IN BRITISH EAST AFRICA

Factory	Location	Owner	Capacity (Tons Cane per 24 Hrs.)
Muharoni	Muharoni, Kenya	Nottidge & Allan	----
Nairobi	Nairobi, Kenya	Sukari, Ltd.	----
Ramisi	Ramisi, Mombasa, Kenya	Ramisi Sugar Estates, Ltd.	240
Uganda	Lugazi, Uganda	Nanji Kalidas Mehta	500
Victoria	Miwani, Kenya	Victoria Nyanza Sugar Co., Ltd.	650
Uganda (Kakira)	Jinja, Uganda	Uganda (Kakira) Sugar Works, Ltd.	400

SOUTH AFRICAN UNION

SUGAR cane cultivation was introduced into the coast region of Natal in 1850 but the industry grew slowly and for many years its output was insufficient to supply the needs of the local market. Since the world war, expansion has been more rapid and the extension of the industry into Zululand has increased production which has now reached a point where approximately 50 per cent of the crop is shipped to the British market.

South Africa being located some 30 degrees south of the Equator, its climatic conditions are sub-tropical. Plant cane requires approximately two years to mature and eighteen months are allowed for the growth of ratoon crops. The variety of cane most extensively grown is Uba, favored for its resistance to mosaic in spite of the greater difficulty in [illegible] the greatest hazard [illegible] is the factor chiefly [illegible] output. Production during the [illegible] of 2,240 pounds, is shown [illegible]

Year	[illegible]	[illegible]	[illegible]
1918	134,120	[illegible]	[illegible]
1919	160,013	[illegible]	[illegible]
1920	128,834	[illegible]	[illegible]
1921	135,258	[illegible]	[illegible]
1922	150,050	[illegible]	[illegible]
1923	141,324	[illegible]	[illegible]
1924	144,500	[illegible]	[illegible]
1925	215,000	[illegible]	[illegible]
1926	210,210	[illegible]	[illegible]
1927	220,000	[illegible]	[illegible]

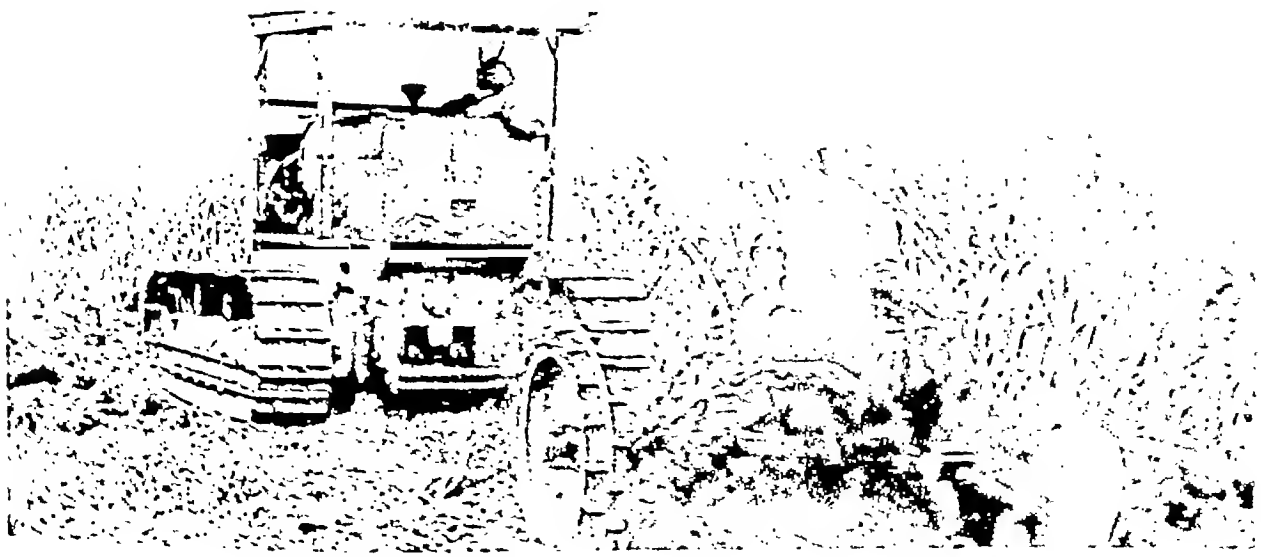
SUGAR FACTORIES IN NATAL PROVINCE

Factory	Owner
Umdhloti, near Verulam	Central Factory [illegible], Ltd.
Chaka's Kraal	ChaLa's Kraal Sugar Co., Ltd.
Renishaw	Crookes Bros., Ltd.
Gingindhlovu, North Coast	Delville Estates, Ltd.
P. O. Nonoti near Stanger	Doornkop Sugar Estate, Ltd.
Entumeni, near Eshowe	Entumeni Sugar Mfg. Co. [illegible] Ltd.
Gledhow, near Stanger	Gledhow Sugar Estates, Ltd.
Glendale, near Kearsney	Glendale Sugar Estates
Amatikulu, Zululand	Sir J. L. Hulett & Sons, Ltd.
Darnall	Sir J. L. Hulett & Sons, Ltd.
Felixton, Zululand	Sir J. L. Hulett & Sons, Ltd.
Tinley Manor	Sir J. L. Hulett & Sons, Ltd.
*Illovo	Illovo Sugar Estates, Ltd.
Groutville, near Stanger	Melville Sugar Co., Ltd. [illegible]
*Mount Edgecombe	Natal Estates, Ltd.
New Guelderland	New Guelderland Sugar [illegible]
Prospecton Sugar Estates, Ltd.	Cecil Platt & [illegible]
Esperanza	Reynolds Bros., Ltd.
Sezela	Reynolds Bros., Ltd.
Mtubatuba, Lower Umfolozi	Shire's Estates [illegible]
Tongaat, Natal	Tongaat Sugar Co., Ltd.
Riverview, Umfolozi, Zululand	Umfolozi Co-Operative [illegible]
Batstones P. O.	Umzimkulu Sugar Co., Ltd.
Empangeni Rail, Zululand	Zululand Sugar Mfg. & [illegible]

*Also refinery.

REFINERY

Name	Owner
Reesbarch	Hulett's Sugar [illegible]



Crew Pulling Sugar Cane Locally, Illovo Sugar Estates, Natal, South Africa

Mauritius and Reunion

THOUGH a small island, with an area of only 710 square miles, Mauritius has long been an important figure in the sugar trade of the British Empire. Sugar production was established on a permanent basis about 1750. Though primitive methods of cultivation and extraction were employed in the early days of the industry, great advances were made in the later years of the nineteenth century and thorough modernization of milling practice took place. Production during the past twenty-two years is shown in the accompanying table in tons of 2,240 pounds.

Year	Tons	Year	Tons
1916	205,145	1927	215,555
1917	200,600	1928	247,752
1918	212,500	1929	238,030
1919	241,067	1930	220,960
1920	231,437	1931	163,210
1921	179,354	1932	247,029
1922	231,190	1933	261,460
1923	201,550	1934	178,860
1924	224,710	1935	280,700
1925	241,220	1936	285,129
1926	192,590	1937	313,816

Recent production on the island of Reunion, a colony of France, has been as follows: 1934-35, 63,593 tons; 1935-36, 91,051; 1936-37, 83,761, and 1937-38, 79,878.

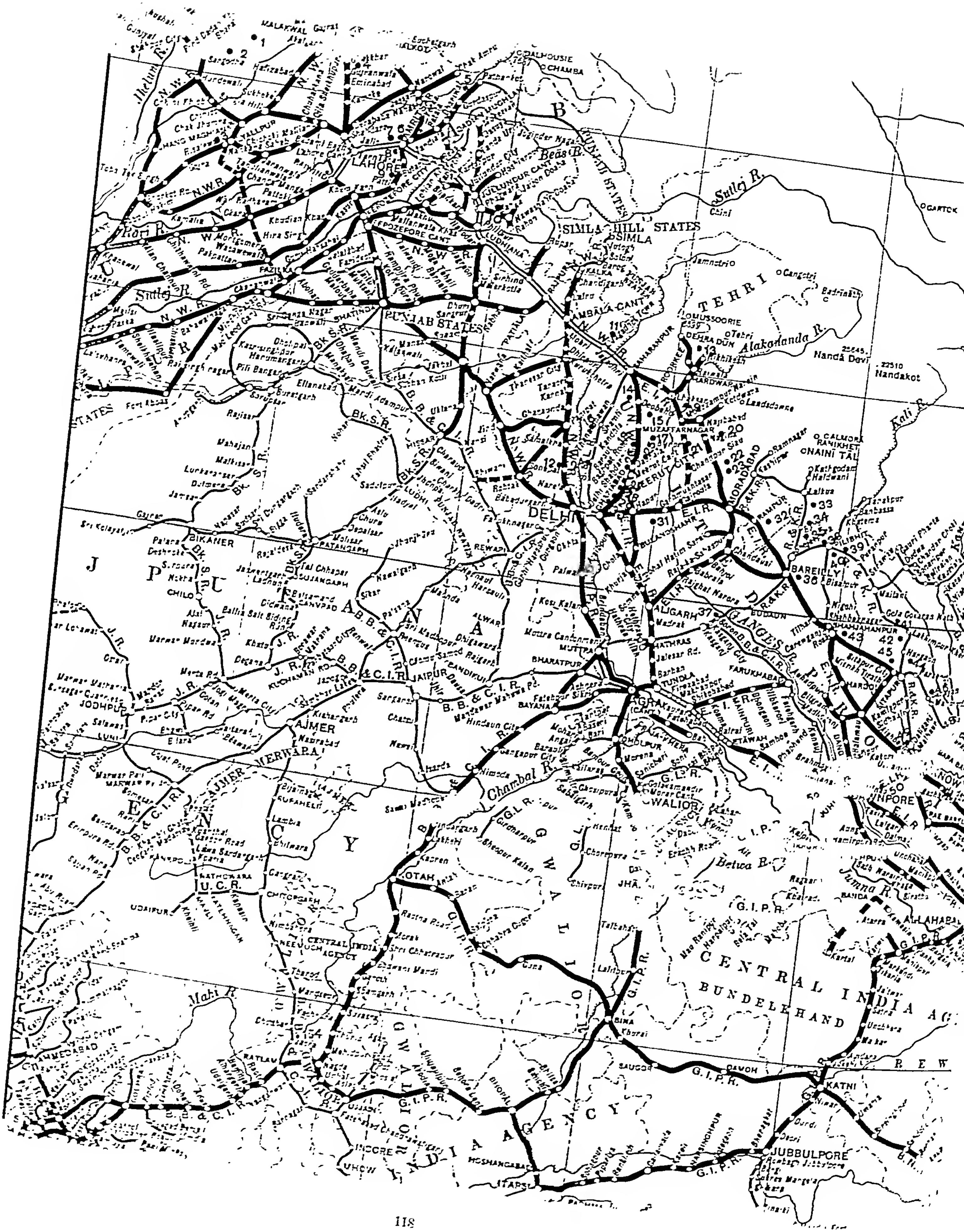
SUGAR FACTORIES IN MAURITIUS

Factory	Location	Owner	Capacity (Tons Cane per 24 Hrs.)
Alma	Verdun, Moka	Alma, Ltd.	
Antoinette	Rivière du Rempart	Antoinette Sugar Estate Co., Ltd.	
Argy	Argy, Flacq	Nouvelle Société Baschet & Cie	
Beau Champ	Grand River Southeast	Mauritius Agricultural & Industrial Co., Ltd.	60
Beau Plan	Pamplemousses	Beau Plan Sugar Estate Co., Ltd.	
Beau Séjour	Mapou, Riv. du Rempart	Beau Sejour Sugar Estate Co., Ltd.	
Beau Vallon	Mahebourg, Grand Port	Cie. Sucrière de Beau Vallon, Ltée	
Bel Ombre	Souillac, Savanne	Bel Ombre Sugar Estate Co., Ltd.	
Belle Vue	Mapou, Pamplemousses	Harel Frerès	600
Bénarès	Rivière des Anguilles, Savanne	Benares Cooperative Factory, Ltd.	
Britannia	Rivière Dragon, Savanne	Anglo-Ceylon & General Estates Co., Ltd.	
Constance	Argy, Flacq	Constance & La Gaiété Sugar Estate Co., Ltd.	
Deep River	Bel Air, Flacq	Deep River Sugar Estate Co., Ltd.	
Deux Bras	New Grove, Grand Port	Cie. Sucrière de Beau Vallon, Ltée	
Ferney	Mahebourg, Grand Port	Cie. Sucrière de Ferney, Ltd.	500
Highlands	Phoenix, Plaines Wilhelms	Anglo-Ceylon & General Estates Co., Ltd.	
Labourdonnais	Mapou, Riv. du Rempart	Labourdonnais Sugar Estate Co.	
Le Val	Cluny, Grand Port	H. G. Ducray & Company	450
Le Vallon	Mahebourg, Grand Port	Soc. Sucrière du Vallon, Ltd.	
L'Union	Flacq, Flacq	Hon. R. Gujadhur	950
Médine	Port Louis, Black River	Medine Sugar Estate Co.	960
Mon Désert	St. Pierre, Moka	Cie. Sucrière de Mon Désert, Ltd.	1200
Mon Loisir	Poudre d'Or, Riv. du Rempart	Hon R. Gujadhur	
Mon Trésor	Union Vale, Grand Port	Mon Désert & Mon Trésor, Ltd.	
Queen Victoria	Argy, Flacq	Queen Victoria Sugar Estate Co., Ltd.	
Réunion	Vacoas, Plaines Wilhelms	Réunion, Ltd.	510
Riche-en-Eau	Rose Belle, Grand Port	Cie. Sucrière de Beau Vallon, Ltée	
Rivière des Anguilles*	Rivière des Anguilles, Savanne	E. de Senneville & Co.	
Rose Belle	Rose Belle, Grand Port	Mauritius Agricultural & Industrial Co., Ltd.	
St. Antoine	Poudre d'Or, Riv. de Rempart	Cie. Sucrière de St. Antoine, Ltd.	800
St. Aubin	Rivière des Anguilles, Savanne	St. Aubin Sugar Estate Co., Ltd.	
St. Felix	Souillac, Savanne	St. Felix Sugar Estate Co.	
Sans Souci	Montagne Blanche, Moka	Bel Etang & Sans Souci Co., Ltd.	
Savannah	Rivière des Anguilles, Savanne	Savannah Sugar Estates Co., Ltd.	
Savinia	Grand Port		
Solitude	Pamplemousses	Harel, Mallac et Cie	600
Terracine	Souillac, Savanne	Terracine Sugar Estate Co., Ltd.	
The Mount	Pamplemousses	The Mount Sugar Estates Co., Ltd.	
Trianon	Rose Hill, Plaines Wilhelms	Lady Barkley, et al	
Union	Rivière des Anguilles, Savanne	Union Sugar Estates Co., Ltd.	
Valona	Grand Port		

*Not operating.

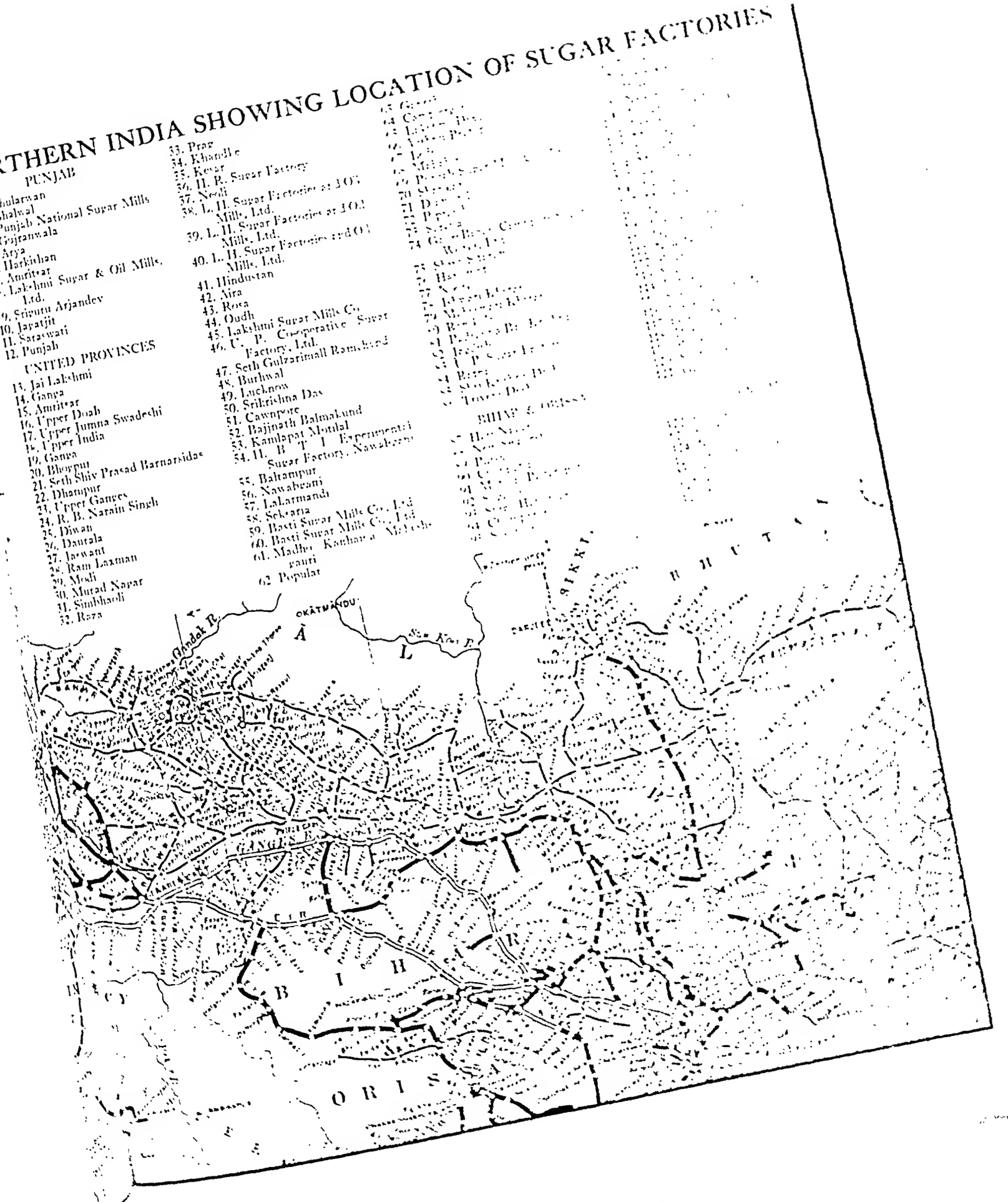
SUGAR FACTORIES IN REUNION

Factory	Location	Owner
Beaufonds	Saint Benoit	Sucreries Coloniales
Bois Rouge	Cambuston	Société Adrian Bellier
Casernes	Saint Pierre	Société Anon. des Casèrnes
Eperon	Saint Paul	Société Anon. Sucrière d'Eperon
Le Gol	Saint Louis	Leonus Benard et Cie.
Grands Bois	Saint Pierre	Société Anon. des Casèrnes
LaMarie	Sainte Marie	Société Anon. Sucrière Adam de Villiers
Pierrefond	Saint Louis	Leonus Benard et Cie.
Quartier-Francais	Cambuston	Société Anon. Cooperative
Ravine Creuse	Saint Andre	Sucreries Coloniales
Ravine Glissante	Sainte Rose	Joseph Mourouvin
Rivière du Mat	Saint Andre	Octave Nillemogom
Savannah	Saint Paul	Soc. Anon. de Savannah
Stella	Saint Leu	Société Civile Stella
Vue Belle	Saint Paul	Sucreries Coloniales

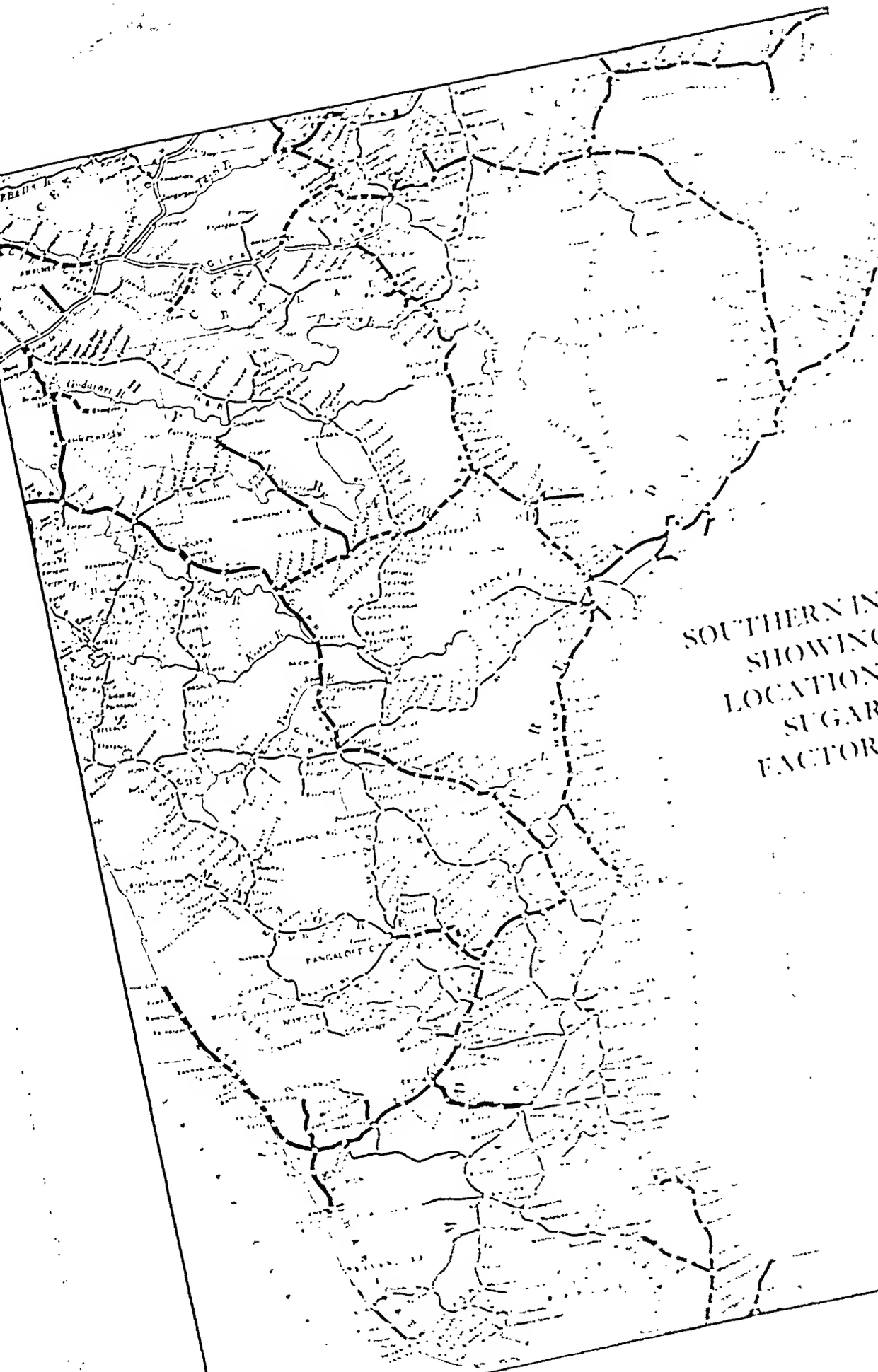


LAHORE
AMRITSAR
FEROZEPORE CITY
FEROZEPORE CANT
JULLUNDUR CANT
LUDHIANA
SIMLA HILL STATES
SIMLA
KALKA
AMBALA CANT
SAHARANPUR
DEHRA DUN
MUSSOORIE
TEHRI
HARDWAR
ROORKEE
MUZAFFARNAGAR
MEERUT CITY
MORADABAD
DELHI
BULANDSHAHR
ALIGARH
HATHRAS
MUTTRA
AGRA
TUNDLA
BHARATPUR
BAYANA
DHOLPUR
GWALIOR
BAREILLY
RAMPUR
SHAHJAHANPUR
HARDOI
FARUKHABAD
ETAWAH
NAINI TAL
RANIKHET
ALMORA
GARTOK
Nanda Devi
Nandakot
PUNJAB STATES
PATIALA
HISSAR
BIKANER
JODHPUR
JAIPUR
AJMER
AJMER MERWARA
ALWAR
REWARI
KOTAH
UDAIPUR
CHITORGARH
RATLAM
UJJAIN
INDORE
MHOW
BHOPAL
BINA
SAUGOR
DAMOH
KATNI
JUBBULPORE
HOSHANGABAD
ITARSI
JHANSI
BANDA
ALLAHABAD
CAWNPORE
LUCKNOW
FAZILKA
BHATINDA
KHANEWAL
CENTRAL INDIA AGENCY
BUNDELKHAND
GWALIOR
RAJPUTANA
Sutlej R.
Beas R.
Ravi R.
Jhelum R.
Chambal R.
Betwa R.
Jumna R.
Ganges R.
Alakananda R.
Kali R.
Mahi R.
N.W.R.
E.I.R.
G.I.P.R.
B.B. & C.I.R.
R.&K.R.
J.R.
Bk.S.R.
U.C.R.

NORTHERN INDIA SHOWING LOCATION OF SUGAR FACTORIES



Factory	Location	Owner (Managing Agent)	Capacity (Tons Cane per 24 Hrs.)
Deoria	Deoria, Gorakhpur	Deoria Sugar Mills, Ltd. (Karam Shand Thapar & Bros., Ltd., Calcutta)	650
Deshabandhu	Charsindur, Dacca	Deshabandhu Sugar Mills, Ltd. (The Industrial Agency, Dacca)	200
Dhampnr	Dhampur, Bijnor	Dhampur Sugar Mills, Ltd. (Sahu Ram Narain, Dhampur)	500
Diamond	Pipraich, Gorakhpur	Diamond Sugar Mills, Ltd. (Murarka & Sons, Ltd., Calcutta)	450
*Diwan	Sakhoti-Tanda, Meerut	Seth Dhanpatmal Diwanchand, Lyallpur, Punjab	400
Dnmraon Raj	Bikramganj, Shahabad	Maharaja Bahadur of Dumraon	400
East Bengal	Shome, Dacca	East Bengal Sugar Mills, Ltd. (Ramnath Das & Co., Dacca)	100
Etikoppaka	Etikoppaka, Vizagapatam	Etikoppaka Co-operative Industrial & Credit Society, Ltd.	50
Ganesh	Pharenda, Gorakhpur	Ganesh Sugar Mills, Ltd. (Poddar Jaipuria & Co., Calcutta)	575
Ganga	Deoband, Saharanpur	Ganga Sugar Corp., Ltd., Rawalpindi, Punjab	700
*Ganga Deshi	Buxar, Shahabad	B. N. Brothers & Sons, Dnmraon	100
Ganga Devi	Naraipur, Champaran	Mawari Brothers, Naraipur	400
*Ganri	Gauribazar, Gorakhpur	Cawnpore Sugar Works, Ltd. (Begg, Sutherland & Co., Ltd., Cawnpore)	325
*Gaya	Guraru, Gaya	Gaya Sugar Mills, Ltd.	550
*Ghughli	Ghughli, Gorakhpur	Punjab Sugar Mills Co., Ltd. (Narang Bros. & Co., Ltd., Lahore)	500
Gujranwala	Rahwali, Gujranwala	Gujranwala Sugar Mills Co., Ltd. (Narang Bros. & Co., Ltd., Lahore)	300
*Hanumat	Deoria, Gorakhpur	Lakshminarayan Mathura Prasad	100
†Harcourt Butler	Nawabganj, Cawnpore	Harcourt Butler Experimental Sugar Factory	24
*Harinagar	Ramnagar, Champaran	Harinagar Sugar Mills, Ltd. (Narainlal Bansilal, Bombay)	900
*Hundusthan	Golagokarannath, Kheri	Hindusthan Sngar Mills, Ltd. (Bachharaj & Co., Ltd., Bombay)	1000
Hospet	Hospet, Bellary	India Sugars & Refineries, Ltd., Hospet (Ranga Nathan & Co., Madras)	400
Indian Sugar Works	Siwan, Saran	Moulvi Mohd, Abdul Razzaq, Siwan	500
*Ishwari Khetan	Lakshmiganj, Gorakhpur	Ishwari Khetan Sugar Mills, Ltd. (Devidutt Surajmull, Padrauna, Gorakhpur)	675
Jagatjit	Phagwara, Jullundur	Jagatjit Sugar Mills, Ltd. (Narang Bros. & Co., Ltd., Lahore)	704
Jagdish	Kathkuiyan, Gorakhpur	Jagdish Sugar Mills, Ltd. (Brijnarayan Singh & Co., Padrauna)	400
*Jailakshmi	Doiwala, Dehra Dun	Jailakshmi Sugar Co., Ltd. (Jishnu Lal, Doiwala)	500
Jaora	Jaora, Jaora	Jaora Sugar Mills (Kalu Ram Govind Ram, Jaora)	500
Japaha	Japaha, Muzaffarpur	S. & G. Richardson, et al	400
Jaswant	Malyana, Meerut	Jaswant Sugar Mills, Ltd. (Jaswant rai Churamani Meerut)	300
Jwalapur	Jwalapur, Saharanpur	Haji Habib Kasam, Cawnpore	100
Kalamb	Kalamb, via Baramati, Poona	Marsland, Price & Co., Ltd., Bombay	600
Kalyanpore	Kalyanpore, South Kanara	Kalyanpore Sugar Mills, Ltd., Mangalore	60
*Kesar	Baheri, Bareilly	Kesar Sugar Works, Ltd. (Kilachand Devchand & Co., Bombay)	1100
*Khandke	Baheri, Bareilly	Khandke Sugar Mills, Ltd. (D. N. Khandke & Co.)	290
*Kolhapur	Kolhapur, Kolhapur	Kolhapur Sugar Mills Co., Ltd. (Shirgaoker Bros., Kolhapur)	300
Lakarmandi	Lakarmandi, Gonda	Lakarmandi Sugar Mills Co., Ltd.	125
*Lakshmi	Maholi, Sitapur	Lakshmi Sugar Mills Co. (Seth Kishori Lal, Maholi)	1000
Lakshmi Devi	Chitauni, Gorakhpur	Lakshmi Devi Sugar Mills, Ltd. (Agarwal & Co., Khadda)	400
Ledi	Nichlaul, Gorakhpur	Ledi Sugar Factory (Dr. K. K. Bhargava, Nichlaul)	80
Lohat	Lohat, Darbhanga	Darbhanga Sugar Co., Ltd. (Octavius Steel & Co., Ltd., Calcutta)	1300
*Lucknow	Aishbagh, Lucknow	Lucknow Sugar Works, Ltd., Lucknow	400
Lyallpur	Lyallpur, Lyallpur	Punjab National Sugar Mills (Sh. Sharif Ahmad, Lyallpur)	70
Madho Kanhaya	Munderwa, Basti	Madho Kanhaya Mahesh Gauri Sugar Mills, Ltd.	450
Mahabir	Siswa Bazar, Gorakhpur	Mahabir Sugar Mills, Ltd. (Dwarkadas Baijnath)	400
*Maharajganj	Maharajganj, Saran	Maharajganj Sugar Co., Ltd. (Bhargava Bros. & Co., Maharajganj)	150
Maharashtra	Tilaknagar, Ahmednagar	Maharashtra Sugar Mills, Ltd. (M. L. Dahanukar & Co., Ltd., Bombay)	550
*Maheshwari Khetan	Ramkola, Gorakhpur	Maheshwari Khetan Sugar Mills, Ltd. (Devidutt Chaturbhuj, Ramkola)	400
*Marhowrah	Marhowrah, Saran	Cawnpore Sugar Works, Ltd. (Begg, Sutherland & Co., Ltd., Cawnpore)	925
*Modi	Begamabad, Meerut	Modi Sugar Mills, Ltd. (Multanimal & Sons, Patiala)	500
Motilal Padampat	Majhaulia, Champaran	Lala Dwarkadas Thunghumwalla and Lala Padampat Singhania	850
Motipur	Motipur, Muzaffarpur	Motipur Sugar Factory, Ltd. (Seth Haji Abdulla Haroon, Karachi, and Seth Abdul Rahim Oosman, Calcutta)	1100
Muradnagar	Muradnagar, Muradnagar	Muradnagar Sugar Works (Bal Krishen Das, Delhi)	65
Mysore	Mandya, Mysore	Mysore Sugar Co., Ltd., Bangalore	1400
Narain Singh	Baraut, Meerut	R. B. Narain Singh Sugar Mills, Ltd. (Sardar Ranjit Singh, New Delhi)	675
Nawabganj	Nawabganj, Gonda	Nawabganj Sugar Mills, Ltd. (Narang Bros. & Co., Ltd., Lahore)	1850
*Nellikuppam	Nellikuppam, So. Arcot	East India Distilleries & Sugar Factories, Ltd. (Parry & Co., Ltd., Madras)	850
Neoli	Neoli, Etah	Saraswati Sugar Syndicate Ltd.	600
New India	Hasanpur, Darbhanga	New India Sugar Mills, Ltd. (B. R. Loyalka, Calcutta)	600



SOUTHERN INDIA
SHOWING
LOCATION OF
SUGAR
FACTORIES

Factory	Location	Owner (Managing Agent)	Capacity (Tons Cane per 24 Hrs.)
*New Savan	Siwan, Saran	New Savan Sugar & Gur Refining Co. (Andrew Yule & Co., Calcutta)	650
New Swadeshi	Narkatiaganj, Champaran	New Swadesbi Sugar Mills, Ltd. (Birla Bros., Ltd., Bombay)	850
*Noori	Bhatni, Gorakbpur	Noori, Mian & Co., Bhatni	550
*North Bengal	Gopalpur, Rajshabi	North Bengal Sugar Mills Co., Ltd. (Soorajmull Nagarmull, Calcutta)	1000
Oudh	Hargaon, Sitapur	Oudb Sugar Mills, Ltd. (Birla Bros., Ltd., Bombay)	1500
*Padrauna	Padrauna, Gorakhpur	Padrauna Rajkrishna Sugar Works, Ltd.	800
Phalton	Pimpalwaldi, Satara	Phalton Sugar Works (Vaman Shridhar Apte, Bombay)	500
Phulerwan	Phulerwan, Sargodha	Phulerwan Sugar & Oil Mills, Ltd. (Radhakrishna Bros.)	100
Pilibhit	Pilibhit, Pilibhit	L. H. Sugar Factories & Oil Mills, Ltd.	1200
Pioneer Sind	Pritamabad, Nawabshaha	Pioneer Sind Sugar Mills, Ltd. (Mohata Mukhi & Co., Karachi)	300
Pipraich	Pipraich, Gorakhpur	Pipraich Sugar Mills, Ltd. (Mohmmad Ashfaq)	250
*Prag	Kichha, Naini Tal	Shamlal Pragnarayan, Vakil Rawatpara (Agra)	700
Pursa	Lauriya, Champaran	Pursa Co., Ltd., Pursa	475
Purtabpore	Mairwa, Gorakhpur	Purtabpore Co., Ltd. (Begg, Sutherland & Co., Ltd., Cawnpore)	660
Rajlakshmi	Bashirhat, 24 Parganas	Rajlakshmi Sugar Mills (Kartic Bose & Sons, Calcutta)	100
Ramkola	Ramkola, Gorakbpur	Ramkola Sugar Mills Co., Nawashahar (Hazara)	600
Ram Lakshman	Mohiuddinpur, Meerut	Dina Nath Nanak Chand & R. B. Setb Lakshman Dast Sons, Delhi	400
*Ratna	Shahganj, Jaunpur	Ratna Sugar Mills Co., Ltd. (Kashiprasad & Co., Benares City)	500
Ravalgaon	Ravalgaon, Nasik	Ravalgaon Sugar Farm, Ltd. (Walchand & Co., Ltd., Bombay)	300
Raza	Rampur, Rampur	Raza Sugar Co., Ltd. (Govan Bros., Ltd., Rampur)	955
*Rohtas	Dalmianagar Dehri-on-Sone, E.I.R.	Rohtas Sugar Co., Ltd. (Dalmia Sabharwal Jain & Co., Dinapur)	1800
*Rosa	Rosa, Shahjahanpur	Lyall, Marshall & Co., Calcutta	600
*Ryam	Ryam, Darbhanga	Ryam Sugar Co., Ltd. (Begg, Sutherland & Co., Ltd., Cawnpore)	750
Sahmaw	Sahmaw, Mitkyina, Burma	Burma Sugar Co., Ltd. (Finlay, Fleming & Co., Ltd., Rangoon)	600
Sakri	Sakri, Darbhanga	Darbhanga Sugar Co., Ltd. (Octavius Steel & Co., Ltd., Calcutta)	700
*Samastipur	Samastipur, Darbhanga	Samastipur Central Sugar Co., Ltd. (Begg, Sutherland & Co., Ltd., Cawnpore)	700
*Saraswati	Jagadhri, Ambala	Saraswati Sugar Mills (F. A. Sherwani, P. O. Soron, Etah, U. P.)	400
*Saraya	Sardarnagar, Gorakhpur	Sir Sundar Singh Majithia, Sardarnagar	2000
*Sasa Musa	Sasa Musa, Saran	Sasa Musa Sugar Works, Ltd. (Mousell & Co., Ltd., Calcutta)	450
Saswad Mali	Akluj, Sholapur	Saswad Mali Sugar Factory, Ltd. (J. M. Mehta, Bombay)	300
*Seksaria	Babbnan, Gonda	Seksaria Sugar Mills Co., Ltd. (Govindram Ramnath & Co., Calcutta)	500
*Semapur	Semapore, Purnea	Purnea Sugar Co., Ltd. (Octavius Steel & Co., Ltd., Calcutta)	700
Serampore	Balabpore, Hooghly	Serampore Sugar Works, Ltd., Serampore	575
*Setabganj	Setabganj, Dinajpur	Setabganj Sugar Mills (Soorajmull Nagarmull, Calcutta)	500
Seth Gulzarimall	Jarwal Road, Bahraich	Messrs. Gulzarimull Ramchand, Lahore, & Lala Jaswant Rai & Sons, Karachi	400
Seth Shiva Prasad	Bijnor, Bijnor	Shiva Prasad Banarsidas, Agarwal, Lahore	800
*Shankar	Captainganj, Gorakhpur	Shankar Sugar Mills, Ltd. (Inderchand Hariram)	150
Shikarpur	Shikarpur, Jalpaiguri	Shikarpur Sugar Mills, Jalpaiguri	500
Shree Guru Arjundev	Butari, Amritsar	Shri Guru Arjundev Sugar Mills (Seth Sundar Singh, Butari)	700
*Shree Hanuman	Motihari, Champaran	Sbree Hanuman Sugar Mills, Ltd. (Daulatram Rawatmull, Calcutta)	680
*Shree Radha Krishna	Beldanga, Murshidabad	Shree Radha Krishna Sugar Mills, Ltd. (Jhajharia Bros., Ltd., Calcutta)	600
Shree Sitaram	Baitalpur, Gorakhpur	Shree Sitaram Sugar Co., Ltd. (Karamchand Thapar & Bros., Ltd., Calcutta)	400
*Shri Krishna Deshi	Jhusi, Allahabad	Kishorylal Makundlal, Calcutta	800
*Shri Krishna Gyanoday	Mirgani, Saran	Messrs. Dalmia Jain & Co.	75
Shri Lakshmi Narayan	Nirmali, Bhagalpur	Shri Lakshmi Narayan Sugar Works, Ltd. (Gupta Bros. & Co., Nirmali)	400
*Simbhaoli	Baksar, Meerut	Sardar Raghbir Singh Sahib Sendhanwalia, Baksar	800
Sitalpur	Sitalpur, Saran	Sitalpur Sugar Works, Ltd. (H. K. Ghosh, Allahabad)	300
*Sonepat	Sonepat, Rohtak	Ganesh Flour Mills Co., Ltd., Delhi	850
*South Bihar	Bihta, Patna	South Bihar Sugar Mills, Ltd. (Nirmal Kumar Jain & Co., Arrah)	93
Sree Ram	Bobbili, Vizagapatam	Raja of Bobbili and Shree Kunwar Raja of Venkatagiri, Vizagapatam	575
Sri Ram Krishna	Kirlampudi, East Godavari	Zamindar of Kirlampudi	400
Sugauli	Sugauli, Champaran	Sugauli Sugar Wks., Ltd. (Hanif & Amjed Ali, Calcutta)	200
Thaton	Honipale, Thaton	Thaton Sugar Works, Ltd. (Robertson & Co., Rangoon)	700
*Tribeni Desi	Naini, Allahabad	A. Beni Prasad, Naini, Allahabad	700
Tulsipur	Tulsipur, Gonda	Tulsipur Sugar Factory, Ltd. (Begg, Sutherland & Co., Ltd., Cawnpore)	1100
*Upper Doab	Shamli, Muzaffarnagar	Upper Doab Sugar Mills, Ltd. (Hariraj Swarup, Rajendralal, Debi Prasad & Bros., Muzaffarnagar)	650
Upper Ganges	Seohara, Bijnor	Upper Ganges Sugar Mills, Ltd. (Birla Bros., Ltd., Calcutta)	
Upper India	Khatauli, Muzaffarnagar	Upper India Sugar Mills, Ltd. (Mitra Mandal, Delhi)	

Java

WHILE sugar cane has been grown in Java from very early times, the exact date of its introduction being unknown, the establishment of sugar production as an industry of commercial importance under the direction of the Dutch proprietors dates back to about 1640. Early production was of very limited volume, however, and it was not until after the Napoleonic wars that Java became a factor of importance in the sugar trade. By 1842 the output had risen to 50,000 tons and in a few years later it passed 100,000 tons.

The grinding season in Java begins in late April or May and extends to November. A very large part of the crop is turned out in the form of white sugar ready for consumption, while smaller proportions are in the form of brown sugar, muscovados, and molasses sugars. The figures in the accompanying table refer to the sugar as produced, without attempting to give the equivalent value in the raw form. The tons used are long tons of 2,240 pounds.

In 1930 there were 179 active sugar mills in Java. In 1934 the number actually grinding cane was only 49, and for the 1935 campaign this number was reduced to 38.

In 1931, with Java's adherence to the Chadbourne agreement, regulation of production and export quotas was placed under the control of an organization of producers known as the Visoco, which in 1933 was superseded by another organization with more comprehensive powers, known as the Nivas (Nederlandsche Indische Vereeniging voor den Afzet van Suiker). The Nivas is the sole selling agency for Java sugar, as well as the authority which apportions quotas among the producers, with the Governor General of the Indies retaining a veto power over its decisions.

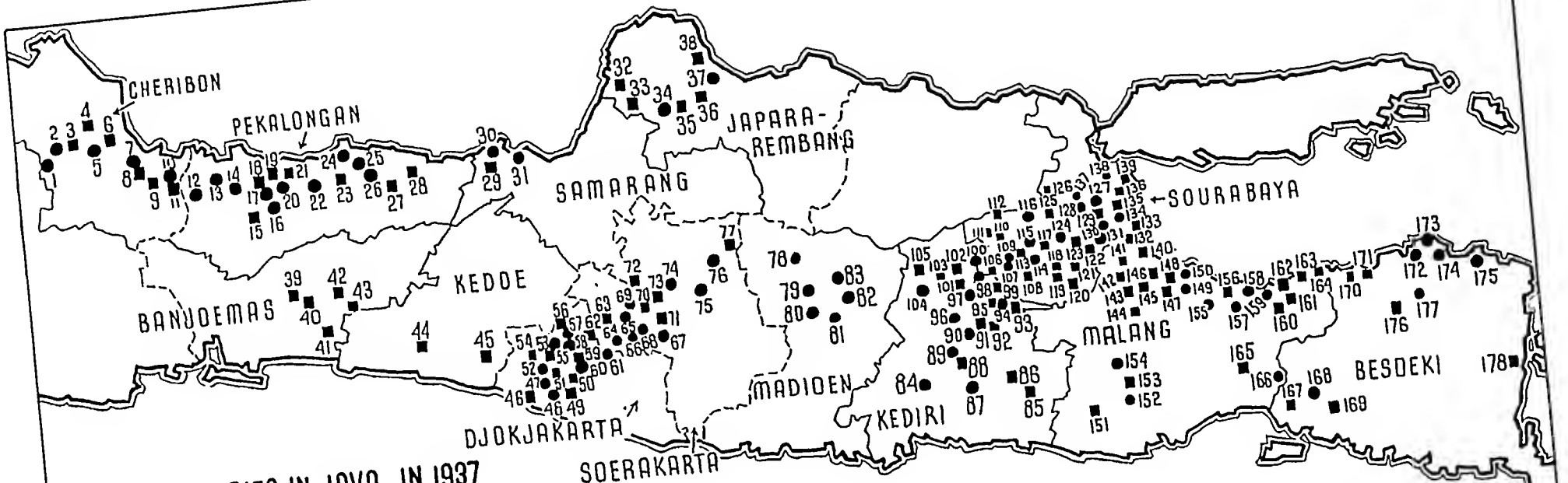
With the expiration of the Chadbourne agreement on September 1, 1935, plans were drawn for a new scheme of regulation of the industry under stricter governmental supervision. This scheme, which is operative for the crop years 1936-39, proposed to restrict production to approximately 1,500,000 tons annually during that period. Base quotas were assigned each mill or group of mills under single control, their production for the year 1931 being taken as a standard. Under this arrangement some of the concern mills have been permanently closed and production concentrated in the others.

As the figures show, Java's sugar production increased rapidly from 1920 onward until in 1931 the country became a party to the international sugar agreement for the restrictions of exports and the reduction of surplus stocks. The sharp decrease in production since 1932 is the result of restrictions on plantings adopted in conformity with the requirements of this agreement and further restrictions adopted as a result of the loss of important export markets in India and elsewhere.

Year	Tons	Year	Tons
1909	1,227,553	1924	1,977,490
1910	1,258,222	1925	2,278,900
1911	1,433,397	1926	1,959,948
1912	1,331,180	1927	2,360,080
1913	1,345,230	1928	2,936,163
1914	1,303,045	1929	2,894,879
1915	1,264,000	1930	2,923,010
1916	1,596,174	1931	2,798,870
1917	1,791,064	1932	2,569,390
1918	1,794,408	1933	1,380,449
1919	1,335,763	1934	646,245
1920	1,508,755	1935	513,554
1921	1,649,610	1936	583,028
1922	1,746,875	1937	1,392,146
1923	1,771,772	1938 (Est.)	1,400,000

SUGAR MILLS IN JAVA

Mill	Location	Owner	1937 Production (Tons of 1000 Kilograms)
Adiwerna	Pekalongan	N. V. Mij. tot Expl. der S. O. Karangsoewoeng, Adiwerna & Djatibarang	
*Alkmaar	Sengon	N. V. Nederlands Handel Mij. (Batavia)	
*Ardjawinangoen	Cheribon	N. V. Ament's Suikerfabrieken	
*Ardjosari	Bangil	O. N. J. C. Dinger	
Asembagoes	Sitoebondo	N. V. Suiker Cult. Mij. te Amsterdam	18,347
*Bagoe	Kraksaan	N. V. Javasche Cultuur Mij.	
*Balapoelang	Balapoelang	Nederlands Indie Landbouw Mij. (Amsterdam)	
Balongbendo	Krian	N. V. Cult. Mij. Balongbendo (Rotterdam)	9,843
Bandjaratma	Tegal	N. V. Koloniale Bank (Amsterdam)	24,365
*Bandjardawa	Pemalang	N. V. Javasche Cultuur Mij. (Amsterdam)	
*Bangsal	Modjokerto	N. V. Mij. tot Expl. der S. O. Sentanen-Lor, Brangkal & Dinoyo (den Haag)	15,815
Bantool	Djokjakarta	N. V. Landbouw Mij. Bantool (den Haag)	
*Baron	Baron	N. V. Mij. tot Expl. v. d. Fabrieken van Liem Tik Kwie	
Barongan	Djokjakarta	N. V. Cult. Mij. Padokan & Barongan	
*Bedadoeng	Djember	N. V. Handelsvereeniging Amsterdam	
Beran	Djokjakarta	N. V. Cultuur Mij. Beran	12,536
*Blimbing	Blimbing, Djobang	N. V. Handelsvereeniging Amsterdam	
*Bodjong	Poerbolinggo	N. V. Suikerfabriek Bodjong (Amsterdam)	
*Boedocan	Besoeki	N. V. Cult. Mij. Boedocan (Amsterdam)	
*Boedoeran	Sidhoardjo	N. V. Nederlands Indie Landbouw Mij.	
Bogokidoel	Paper	N. V. Cult. Mij. Bogokidoel (den Haag)	
*Brangkal	Modjokerto	N. V. Mij. tot Expl. der S. O. Sentanen-Lor, Brangkal & Dinoyo (den Haag)	
Delanggoe	Delanggoe, Solo	N. V. Cult. Mij. Delanggoe (den Haag)	
*Demak Idjo	Demak Idjo	N. V. Cult. Mij. ver Vorstenlanden	
Djatie	Ngandjoek O. L.	N. V. Mij. tot Expl. S. O. Djatie (den Haag)	8,796
Djatibarang	Tegal	N. V. Mij. tot Expl. der S. O. Karangsoewoeng, Adiwerna & Djatibarang	19,139
*Djatiroto	Djatiroto	N. V. Handelsvereeniging Amsterdam	54,312
Djatiwangi	Cheribon	Mij. tot Expl. S. O. Djatiwangi (den Haag)	7,951



SUGAR FACTORIES IN JAVA, IN 1937

● FACTORIES MILLING IN 1937

■ FACTORIES NOT MILLING IN 1937

CHERIBON.
1. Kadhipaten.
2. Djatiwangi.
3. Parocngdjaja.
4. Ardjawinangoen.
5. Gempol.
6. Soerawinangoen.
7. Sindanglaoet.
8. Karangsoewoeng.
9. Djatipiring[1]).
10. Niew-Tersana.
11. Loewoenggadjah.

PEKALONGAN.
12. Ketanggoengan West.
13. Bandjaratma.
14. Djatibarang.
15. Balapoelang.
16. Doekoewringin.
17. Kemanglen.
18. Adiwerna.
19. Pagongan[2]).
20. Pangka.
21. Kemantran.
22. Soemberhardjo.
23. Bandjardawa.
24. Petaroekan.
25. Tjomal.
26. Sragi.
27. Wonopringgo.
28. Kalimati.

SAMARANG.
29. Gemoe.
30. Tjepiring.
31. Kaliwoengoe.

JAPARA REMBANG.
32. Petjangaän[1]).
33. Majong.
34. Rendeng.
35. Tandjoeng Modjo.
36. Langseé[1]).
37. Trangkil.
38. Pakkies.

BANJOEMAS.
39. Poerwokerto.
40. Kalibagor[2]).
41. Kaliredjo[1]).
42. Bodjong[1]).
43. Klampok[1]).

KEDOE.
44. Remboen.
45. Poerworedjo[1]).

DJOKJAKARTA.
46. Sewoegaloor.
47. Gesiekan.
48. Gondang Lipoero.
49. Poendoeng.
50. Barongan.
51. Bantool.
52. Padokan.
53. Demakidjo.
54. Rewoeloe.
55. Tjebongan[2]).
56. Sendangpitoe.
57. Medarie.
58. Beran.
59. Wonotjatoor.
60. Kedatonpleret.
61. Tandjongtirto.
62. Randoegoenting.

SOERAKARTA.
63. Prambonan.
64. Gondang Winangoen
65. Karanganom.
66. Gedaren.
67. Manishardjo.
68. Tjepper.
69. Tjokrotoeloeng.
70. Delanggoe.
71. Wonosarie.
72. Bangak.
73. Kartasoera.
74. Tjolomadoe.
75. Tasikmadoe.
76. Modjo.
77. Kedoengbanteng.

MADIOEN.
78. Soedhono.
79. Poerwodadie.
80. Redjosarie.
81. Pagottan.
82. Kanigoro.
83. Redjoagoeng.

KEDIRI.
84. Modjopanggoeng.
85. Kenongo.
86. Garoem.
87. Koenir.
88. Soemberdadie.
89. Ngadiredjo.
90. Pesantren.
91. Menang.
92. Kawarasan.
93. Kentjong.
94. Tegowangi.
95. Bogokidoel.
96. Meritjan.
97. Minggiran.
98. Poerwosarie.
99. Blimbing.
100. Lestarie.
101. Djoewono.
102. Baron[1]).
103. Koedjonmanis.
104. Djatie.
105. Ngandjoek.

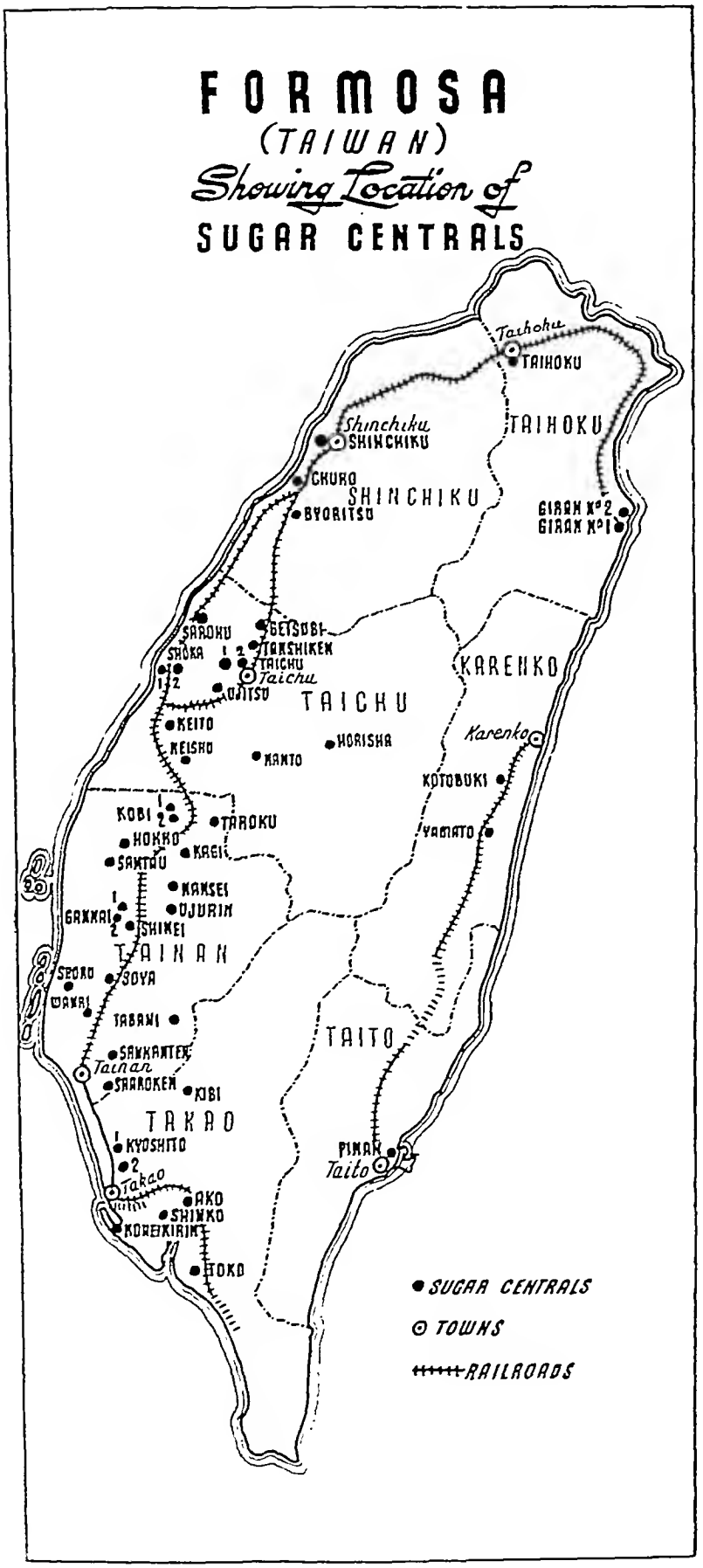
SOURABAYA.
106. Goedo.
107. Tjoekir.
108. Seloredjo.
109. Tjeweng.
110. Djombang.
111. Ngelom.
112. Ponen.
113. Peterongan.
114. Modjoagoeng.
115. Somobito.
116. Gempolkrep.
117. Brangkal.
118. Tangoenan.
119. Dinojo.
120. Pohdjedjer.
121. Ketanen.
122. Sedatie[1]).
123. Koning Willem II.[1])
124. Bangsal.
125. Setanenlor.
126. Perning.
127. Krian.
128. Watoetoelis.
129. Poppoh.
130. Toelangan.
131. Kremboong.
132. Porrong.
133. Tanggoelangin.
134. Tjandie.
135. Boedoeran.
136. Sroemie.
137. Balongbendo.
138. Ketegan.
139. Waroe[1]).

MALANG.
140. Soemberredjo[1]).
141. Ardjosarie.
142. Pandaän[1]).
143. Soekeredjo[1]).
144. Alkmaar[1]).
145. Wonoredjo.
146. Pleret-kloerahan.
147. Gayam[1]).
148. Pengkol.
149. Winongan[3]).
150. Kedawoeng.
151. Pangoongredjo.
152. Krebet.
153. Sempelwadak.
154. Kebonagoeng.
155. Soemberkareng.
156. Oemboel.
157. Wonoasch.
158. Wonolangan.
159. Gending.
160. Maron.
161. Bagoe.
162. Padjarakan.
163. Kandangdjati[1]).
164. Phaiton.
165. Soekodono.
166. Djatiroto.

BESOEKI.
167. Goenoengsarie.
168. Semboroh.
169. Bedadoeng.
170. De Maas.
171. Boedoean[1]).
172. Wringinanom.
173. Olean.
174. Pandjie.
175. Assembagoes.
176. Tangarang.
177. Pradjekan.
178. Soekowidi.

[1]) finally discontinued
[2]) working in 1938
[3]) not working in 1938

Japan and Formosa



SUGAR production in the island of Formosa (Taiwan) has undergone a rapid expansion since the island came under the control of the Japanese in 1898. Prior to that time a great many mills scattered throughout the island were engaged in making a type of brown muscovado sugar that found a good market in China and Japan. Under Japanese control the industry has been modernized and large centrals have replaced the primitive mills. The growth in output is shown by the accompanying table, which gives in tons of 2,240 pounds the production of the past twenty-two years.

In addition to its production of cane sugar Japan controls three beet sugar factories, one located on the northerly island of Hokkaido, one in Korea, and one in northern Manchuria. Production of beet sugar, however, has remained relatively small, amounting only to 25,000 to 27,000 tons annually.

PRODUCTION IN JAPAN AND FORMOSA

Year	Tons
1917	475,080
1918	397,618
1919	415,678
1920	283,482
1921	342,176
1922	406,966
1923	405,800
1924	448,736
1925	554,473
1926	616,584
1927	523,054
1928	692,932
1929	900,344
1930	923,873
1931	928,751
1932	1,147,260
1933	797,678
1934	803,143
1935	1,164,846
1936	1,091,007
1937	1,192,523
1938 (Est.)	1,224,515

Factory	Location	Owner	Capacity (Tons) Cane per 24 Hrs
Sharoku	Taichu-shu	Sharoku Seito Kabushiki Kaisha, Taichu-shu	180
Byoritsu	Shinchiku-shu	Shinchiku Seito Kabushiki Kaisha, Shinchiku-shu	500
Sanshicho	Takao-shu	Shinko Seito Kabushiki Kaisha, Takao-shu, Taiwan	.....
Giran No. 1	Taihoku-shu	Showa-Seito Kaisha, Ltd., Taihoku-shu, Taiwan	.....
Giran No. 2	Taihoku-shu	Showa-Seito Kaisha, Ltd., Taihoku-shu, Taiwan	.....
Gyokusei	Tainan-shu	Showa-Seito Kaisha, Ltd., Taihoku-shu, Taiwan	.....
Taito No. 1	Taito-shu	Taito Seito Kabushiki Kaisha, Taito	.....
Taito No. 2	Taito-shu	Taito Seito Kabushiki Kaisha, Taito	.....
Ako	Takao-shu	Taiwan Seito Kaisha, Ltd., Heito, Takao-shu, Taiwan	3000
Kibi	Takao-shu	Taiwan Seito Kaisha, Ltd., Heito, Takao-shu, Taiwan	1345
Horisha	Taichu-shu	Taiwan Seito Kaisha, Ltd., Heito, Takao-shu, Taiwan	340
Kohekirin	Takao-shu	Taiwan Seito Kaisha, Ltd., Heito, Takao-shu, Taiwan	1000
Koshun	Takao-shu	Taiwan Seito Kaisha, Ltd., Heito, Takao-shu, Taiwan	395
Kyoshito No. 1	Takao-shu	Taiwan Seito Kaisha, Ltd., Heito, Takao-shu, Taiwan	730
Kyoshito No. 2	Takao-shu	Taiwan Seito Kaisha, Ltd., Heito, Takao-shu, Taiwan	400
Sankanten	Tainan-shu	Taiwan Seito Kaisha, Ltd., Heito, Takao-shu, Taiwan	960
Sharoken	Tainan-shu	Taiwan Seito Kaisha, Ltd., Heito, Takao-shu, Taiwan	1200
Taihoku	Taihoku-shu	Taiwan Seito Kaisha, Ltd., Heito, Takao-shu, Taiwan	560
Toko	Takao-shu	Taiwan Seito Kaisha, Ltd., Heito, Takao-shu, Taiwan	700
Wanri No. 1	Tainan-shu	Taiwan Seito Kaisha, Ltd., Heito, Takao-shu, Taiwan	205
Wanri No. 2	Tainan-shu	Taiwan Seito Kaisha, Ltd., Heito, Takao-shu, Taiwan	1000
Chuko	Shinchiku-shu	Teikoku-Seito Kaisha, Ltd., Taichu	550
Shinchiku	Shinchiku-shu	Teikoku-Seito Kaisha, Ltd., Taichu	650
Taichu No. 1	Taichu-shu	Teikoku-Seito Kaisha, Ltd., Taichu	670
Taichu No. 2	Taichu-shu	Teikoku-Seito Kaisha, Ltd., Taichu	260
Tanshiken	Taichu-shu	Teikoku-Seito Kaisha, Ltd., Taichu	750

China

CANE SUGAR FACTORIES

Factory	Location	Owner	Capacity (Tons per 24 hours)
Kwangsi No. 1	Kweihsien, Kwangsi	Kwangsi Provincial Government	300
Shun Teh	Shun Teh, Kwangtung	Kwangtung Provincial Government	1000
Sun Tso	Canton, Kwangtung	Kwangtung Provincial Government	500
Kityang	Swatow, Kwangtung	Kwangtung Provincial Government	750
Sze Tow	Canton, Kwangtung	Kwangtung Provincial Government	1000
Tung Kwun	Tung Kwun, Kwangtung	Kwangtung Provincial Government	1000
Wai-Yeung	Waichow, Kwangtnng	Kwangtung Provincial Government	1000

BEET SUGAR FACTORY

Factory	Location	Owner	Daily Average tons of Beets Sliced
Pu Yi	Tsinan, Shantung	Pu Yi Industrial Company	450

SUGAR REFINERIES

Refinery	Location	Owner	Daily Average Tons of Cane Melted
Ming Hua	Shanghai	Ming Hua Sugar Refinery	200
Taikoo	Hong Kong	Taikoo Sugar Refining Co., Ltd.	.....
Woosung	Shanghai	China National Sugar Refinery	200

SUGAR FACTORIES IN MANCHURIA

Factory	Location	Owner
Ashi-Ho	Ashi-Ho	Ashi-Ho Sugar Factory
Hoten	Mukden	Minami-Manshi, Ltd., Seito Kaisha
Hulan	Hulan, near Harbin	Hulan Sugar Factory

Unloading Sugar Cane at a Waterfront Market in China

Philippine Islands

WHEN the explorer Magellan landed in the Philippines, in 1521, he found that sugar was being made by the natives after primitive methods. It is generally believed that sugar cane cultivation and sugar making were introduced into the islands from China. The industry did not become of commercial importance, however, until after 1850, when cane cultivation began to be developed systematically on the island of Negros, and later on Luzon and Cebu. By 1860 exports of sugar from the islands had risen above 50,000 tons yearly and in 1881 they exceeded 200,000 tons. The high point in this period of progress was reached in 1895, when shipments from the islands amounted to 336,000 tons.

In the years immediately preceding and following the Spanish-American war the sugar trade of the Philippines fell off greatly, and in 1902 exports were only 56,000 tons. After the authority of the United States was established in the islands, the industry began to expand once more and this development proceeded rapidly after restrictions upon the free admission of Philippine sugar into the American market were removed in 1916. At the same time a revolution took place in the organization of the industry, the small old fashioned mills that had been engaged in the production of low grade muscovado sugars giving place to large centrals equipped to turn out centrifugal sugars testing 96 degrees or thereabouts, such as were demanded by the American refiners.

The grinding campaign in the Philippines begins in November and ends in the following May or June. Figures of production given in the tables accompanying are for the crop season ending in the year stated. Figures of export are for calendar years.

Prior to 1922 statistics of production varied according to whether or not the attempt was made to include the low grade sugars produced for local use. A considerable quantity of such sugar is still made in the islands. Statistics of exports, which are given herewith for the past thirty years, illustrate the growth of the industry during this period.

Year	Long Tons	Year	Long Tons
1908	142,448	1923	268,685
1909	127,284	1924	552,176
1910	119,552	1925	538,192
1911	205,741	1926	404,735
1912	195,962	1927	544,579
1913	154,848	1928	554,910
1914	232,761	1929	681,467
1915	207,678	1930	732,221
1916	332,157	1931	741,034
1917	202,654	1932	1,000,501
1918	268,940	1933	1,061,955
1919	133,910	1934	1,141,966
1920	177,491	1935	460,041
1921	285,295	1936	899,276
1922	356,351	1937	844,771

In recent years records of sugar output have been kept by the Philippine Sugar Association. These records, for the past sixteen years, show the following output, in tons of 2,240 pounds:

Year	Centrifugals	Muscovados	Total
1922	218,243	252,550	470,793
1923	223,995	170,278	394,273
1924	310,589	153,791	464,380
1925	490,386	171,039	661,435
1926	563,314	146,144	709,458
1927	526,358	125,619	651,977
1928	565,800	155,543	721,343
1929	689,170	46,250	735,420
1930	775,674		775,674
1931	782,032	45,702	827,734
1932	982,787	37,207	1,019,994
1933	1,145,340	19,920	1,165,260
1934	1,415,236		1,415,236
1935	617,987		617,987
1936	874,542		874,542
1937	1,001,295		1,001,295
1938 (Est.)	985,000		985,000

Under the Philippine independence act, which became effective with the establishment of the Philippine Commonwealth Government on November 15, 1935, entries of Philippine sugar into the United States free of duty are limited to 800,000 long tons of raw and 50,000 tons of refined annually, irrespective of the marketing quotas determined by the Secretary of Agriculture under the Sugar Act of 1937.

PHILIPPINE SUGAR MILLS

Mill	Location	Owner	Capacity (Tons cane per 24 hours)
Arayat	Arayat, Pampanga	Mount Arayat Sugar Co., Inc.	1,250
Asturias	Dumalag, Capiz	Asturias Sugar Central, Inc.	1,350
Bacolod-Murcia	Bacolod, Occ. Negros	Bacolod-Murcia Milling Co., Inc.	3,500
Bais	Bais, Occ. Negros	Central Azucarera de Bais	3,500
Bataan	Balanga, Bataan	Bataan Sugar Company	300
Bamban	Bamban, Tarlac	Central Luzon Milling Co., Inc.	2,200
Bearin	Kabankalan, Occ. Negros	Kabankalan Sugar Co., Inc.	850
Binalbagan	Binalbagan, Occ. Negros	Binalbagan Estate, Inc.	3,400
Bogo-Medellin	Bogo, Cebu	Bogo-Medellin Milling Co., Inc.	1,000
Cabiao	Cabiao, Nueva Ecija	Nueva Ecija Sugar Mills, Inc.	500
Calamba	Canlubang, Laguna	Calamba Sugar Estate	5,000
Calatagan	Calatagan, Batangas	Central Azucarera de Calatagan	700
Calumpit	Calumpit, Bulacan	Luzon Sugar Co., Inc.	500
Cebu	Talisay, Cebu	Cebu Sugar Company	930
Danao	Escalante, Occ. Negros	Central Azucarera del Danao, Inc.	700
Del Carmen	Del Carmen, Pampanga	Pampanga Sugar Mills	4,455
Don Pedro	Nasugbu, Batangas	Roxas y Cia.	2,600
El Real	Calamba, Laguna	Philippine Sugar Estates Development Co.	750
Hawaiian-Philippine	Silay, Occ. Negros	Hawaiian-Philippine Co.	5,500
Isabela	Isabela, Occ. Negros	Isabela Sugar Co., Inc.	2,500
Janiuay	Janiuay, Iloilo	Philippine Starch & Sugar Co.	800
La Carlota	La Carlota, Occ. Negros	Central Azucarera de la Carlota	4,500
Leonor	Escalante, Occ. Negros	Hijos de T. de la Rama & Co.	400


BORNEO

Mill	Location	Owner	Capacity (Tons cane per 24 hours)
Lopez	Fabrica, Occ. Negros	Lopez Sugar Central Mill Co., Inc.	1,300
Lourdes	Dingle, Iloilo	Hijos de T. de la Rama & Co.	150
Lumangub (Santa Aniceta)	Bago, Occ. Negros	Central de la Rama (Iloilo)	360
Luzon	Tarlac, Luzon	Central Luzon Milling Co., Inc.	1,680
Ma-ao	Bago, Occ. Negros	Ma-ao Sugar Central Co., Inc.	3,000
Mabalacat	Mabalacat, Pampanga	Mabalacat Sugar Company	260
Manaoag	Manaoag, Pangosinan	Hind Sugar Co.	400
Manapla	Manapla, Occ. Negros	North Negros Sugar Co., Inc.	3,600
Mindoro	San Jose, Mindoro	Philippine Milling Co., Inc.	1,300
Norte (Candon)	Candon, Ilocos Sur	Valentin Teus	380
Ormoc	Ormoc, Leyte	Ormoc Sugar Co., Inc.	700
Palma	Kabankalan, Occ. Negros	Salvador Serra	600
Paniqui	Paniqui, Tarlac	Paniqui Sugar Mills, Inc.	750
Pasudeco	San Fernando, Pampanga	Pampanga Sugar Development Co.	4,600
Pilar	Pilar, Capiz	Elizalde & Cia., Inc.	1,030
Rosario	Ormoc, Leyte	Rosario Sugar Mills	250
San Carlos	San Carlos, Occ. Negros	San Carlos Milling Co., Ltd.	3,000
San Isidro	Talisay, Occ. Negros	Central de la Rama (Iloilo)	680
Santos-Lopez	Barotac, Nuevo, Iloilo	Central Santos-Lopez Co., Inc.	1,000
Sara-Ajuy	Ajuy, Iloilo	Sara-Ajuy Central Co.	750
Talisay-Silay	Talisay, Occ. Negros	Talisay-Silay Milling Co., Inc.	4,500
Tarlac	San Miguel, Tarlac	Central Azucarera de Tarlac	6,000
Victorias	Victorias, Occ. Negros	Victorias Milling Co.	2,270

Australia, Fiji Islands, New Zealand

OF the six states into which the Commonwealth of Australia is divided, cane cultivation is confined to two, Queensland and New South Wales. The greater part of the crop is made in Queensland, where the cane belt occupies a strip extending along the coast approximately a thousand miles, embracing both subtropical and tropical conditions.

Australia is the only country in the tropics in which cane growing is conducted entirely by white labor. Costs of production are consequently high and to protect the industry an embargo against the importation of foreign sugar has been maintained for many years past. The industry, in fact, is subjected to complete government regulation which fixes the prices of raw and refined sugar, the wages of labor, and the extent of the plantings of individual growers. The industry is operated on a high plane of efficiency and the quantity of cane required to yield a ton of sugar is less than in almost any other country.

As Australia lies in the Southern Hemisphere, the campaign period extends from June or July to the following December or January. Production during the past thirty years has been as follows, in tons of 2,240 pounds of 94 net titre sugar:

Year	Tons	Year	Tons
1908-09	149,394	1923-24	430,344
1909-10	231,353	1924-25	520,285
1910-11	191,123	1925-26	516,155
1911-12	130,525	1926-27	415,690
1912-13	265,148	1927-28	508,602
1913-14	246,970	1928-29	536,968
1914-15	160,205	1929-30	538,065
1915-16	194,985	1930-31	535,064
1916-17	329,240	1931-32	604,844
1917-18	203,520	1932-33	532,763
1918-19	174,524	1933-34	666,741
1919-20	183,358	1934-35	646,253
1920-21	301,876	1935-36	651,658
1921-22	309,150	1936-37	786,909
1922-23	289,500	1937-38 (Est.)	800,000

In addition to its well established cane sugar industry, Australia has a single beet sugar factory, located at Maffra in the state of Victoria. Production at this plant, which is around 5,000 tons annually, is included in the tables.

Production in the Fiji Islands for the past four years is as follows: 1934-35, 112,806 tons; 1935-36, 131,240; 1936-37, 141,780; 1937-38 (Est.) 129,850.

AUSTRALIAN CANE SUGAR FACTORIES

QUEENSLAND

Factory	Location	Owner	Capacity (Tons cane per 24 hours)
Babinda	Babinda, N. Q.	Babinda Central Mill Co., Ltd.	1710
Bingera	Bundaberg	Gibson & Howes, Ltd.	1500
Cattle Creek	Finch Hatton, Mackay	Cattle Creek Co-operative Sugar Milling Ass'n Ltd.	1680
Eagleby	Beenleigh	Eagleby Sugar Co.	
Fairymead	Bundaberg	Fairymead Sugar Co., Ltd.	1400
Farleigh	Mackay	Farleigh Co-operative Sugar Milling Ass'n, Ltd.	
Gin Gin	Gin Gin	Gin Gin Co-operative Sugar Milling Ass'n, Ltd.	420
Goondi	Johnstone River, N. Q.	Colonial Sugar Refining Co., Ltd.	1600
Hambledon	Cairns, N. Q.	Colonial Sugar Refining Co., Ltd.	2500
Inkerman	Carstairs, N. Q.	Pioneer Sugar Refining Co., Ltd.	
Invicta	Giru, N. Q.	Haughton Sugar Co., Ltd.	
Isis	Isis	Isis Central Sugar Mill Co., Ltd.	
Kalamia	Ayr, N. Q.	Australian Estates & Mortgage Co., Ltd.	
Macknade	Herbert River, N. Q.	Colonial Sugar Refining Co., Ltd.	1900
Marian	Marian, Mackay	Marian Central Mill Co., Ltd.	176

Factory	Location	Owner	Capacity (Tons cane per 24 hours
Maryborough	Maryborough	Maryborough Sugar Factory, Ltd.	360
Millaquin	Bundaberg	Millaquin Sugar Co., Ltd.	.....
Moreton	Nambour	Moreton Central Sugar Mill Co., Ltd.	.....
Mossman	Mossman, N. Q.	Mossman Central Mill Co., Ltd.	.....
Mount Bauple	Tiaro	Mt. Bauple Co-operative Sugar Milling Ass'n, Ltd.	.....
Mourilyan	Mourilyan, N. Q.	Australian Sugar Co. Pty., Ltd.	1730
Mulgrave	Gordonvale, N. Q.	Mulgrave Central Mill Co., Ltd.	1990
North Eton	North Eton, Mackay	North Eton Co-operative Sugar Milling Ass'n, Ltd.	.....
Plane Creek	Sarina	Plane Creek Central Mill Co., Ltd.	700
Pleystowe	Pleystowe, Mackay	Amalgamated Sugar Mills, Ltd.	1550
Pioneer	Ayr, N. Q.	Pioneer Sugar Mills Pty., Ltd.	.....
Proserpine	Proserpine	Proserpine Co-operative Sugar Milling Ass'n, Ltd.	1220
Qunaba	Bundaberg	Millaquin Sugar Co., Ltd.	700
Racecourse	Racecourse, Mackay	Racecourse Co-operative Sugar Milling Ass'n, Ltd.	1300
Rocky Point	Woongoolba	W. H. Heck & Sons Pty., Ltd.	210
South Johnstone	South Johnstone, N. Q.	South Johnstone Co-operative Sugar Milling Ass'n, Ltd.	.....
Tully	Tully River	Tully Co-operative Sugar Milling Ass'n, Ltd.	1200
Victoria	Herbert River, N. Q.	Colonial Sugar Refining Co., Ltd.	2300

NEW SOUTH WALES

Factory	Location	Owner	Capacity (Tons cane per 24 hours)
Broadwater	Richmond River	Colonial Sugar Refining Co., Ltd.	1000
Condong	Tweed River	Colonial Sugar Refining Co., Ltd.	1000
Harwood	Clarence River	Colonial Sugar Refining Co., Ltd.	1000

AUSTRALIAN BEET SUGAR FACTORY

Factory	Location	Owner
Maffra	Maffra, Victoria	State of Victoria

AUSTRALIAN CANE SUGAR REFINERIES

Refinery	Location	Owner	Melting capacity (Tons per 24 hours)
Cottesloe	Perth, W. Australia	Colonial Sugar Refining Co., Ltd.	120
Glanville	Adelaide, S. Australia	Colonial Sugar Refining Co., Ltd.	180
Millaquin	Bundaberg, Queensland	Millaquin Sugar Co., Ltd.	.....
New Farm	Brisbane, Queensland	Colonial Sugar Refining Co., Ltd.	170
Pyrmont	Sydney, New South Wales	Colonial Sugar Refining Co., Ltd.	940
Yarraville	Melbourne, Victoria	Colonial Sugar Refining Co., Ltd.	700

SUGAR FACTORIES IN THE FIJI ISLANDS

Factory	Location	Owner	Capacity (Tons cane per 24 hours)
Labasa	Vanua Levu	Colonial Sugar Refining Co., Ltd.	1200
Lautoka	Lautoka	Colonial Sugar Refining Co., Ltd.	3700
Nausori	Rewa River	Colonial Sugar Refining Co., Ltd.	1300
Penang	Penang	Colonial Sugar Refining Co., Ltd.	700
Rarawai	Ba River	Colonial Sugar Refining Co., Ltd.	2300

NEW ZEALAND SUGAR REFINERY

Refinery	Location	Owner	Melting Capacity (Tons per 24 hours)
Chelsea	Auckland	Colonial Sugar Refining Co., Ltd.	520

Trends in Sugar Technology in 1938

By Dr. O. W. Willcox

ALL progressive industries, including the sugar industry, are dominated by the Principle of Least Work. This means that every normal man who has to wrest a living from nature is constantly endeavoring to get through his necessary tasks with the least possible trouble or exertion. The Principle of Least Work is in the back of every inventor's head, urging him to originate a new tool or a new process by which more or better goods may be produced with less labor, which generally means less expense. It is this all-pervasive principle that inspires the agriculturist in the field, the technician in the factory, the chemist in his research laboratory, and even the sales managers and the writers of advertising copy.—All are ceaselessly trying to realize the ideal of maximum returns at minimum cost.

The Real Sugar Producers

The sugar industry is founded almost exclusively on the use of two very unlike species of plants, the sugar beet and the sugar cane. It is these plants that are the real sugar producers, and progress in the sugar is very largely a matter of bringing the cane and the beet into line with the Principle of Least Work; that is, inducing them to yield the largest possible amount of sugar while consuming the least possible amount of plant nutriment and water and occupying the least amount of land space.

However, once a sugar beet seed is planted, or a piece of seed cane buried in a furrow, the yield of sugar will be limited by the nature of the material that has been planted. If the planted material has a large "quantity of life", the amount of sugar harvested in the beets or the cane may be large; in the contrary case the results of the harvest will be less satisfying. Hence the matter of the "quantity of life" possessed by varieties of sugar cane or sugar beet is a vital one. The Principle of Least Work demands that only those varieties with the largest "quantities of life" be planted. Therefore the sugar producers are immediately confronted with the questions, "What varieties have the largest quantities of life?" and "How may new varieties with still larger endowments of vital energy be procured?"

Plant Research

Answers to these questions must be sought by the experiment stations and especially by the geneticists and plant breeders who serve the sugar industry. It is interesting to note that the trend of genetic research is steadily contributing to a demonstration that the first essential characteristic of a high-yielding variety of sugar cane or sugar beet is that it shall have a small percentage content of nitrogen. This principle of the inverse relation of nitrogen content and yield was long ago pointed out by agrobiologists who have urged its more general recognition in the breeding of new and more productive varieties.

Among researches along this line that have been published during the past year, mention may be made of a report by Fort and Holmes on the relative yields and chemical compositions of the cane varieties Co. 281 and 290 in Louisiana. This work showed that although Co. 290 has a much smaller percentage of nitrogen, it actually yields 50 per cent more can than Co. 281 under the same conditions of growth. The same principle has been found in other work to apply to other constituents besides nitrogen, with the general result that those varieties that yield the heaviest crops are also the ones that have the smallest percentage of ash. This is an obvious hint as to one clearly marked direction that sugar beet and sugar cane breeding must take to arrive at greater productivity: select those lines of breeding that will yield varieties with low ash and nitrogen percentages.

Root System Important

However, it is not sufficient to breed for low nitrogen alone; other characteristics are also decisive. The famous corn breeding researches at the Illinois Agricultural Experiment Station have shown that the nitrogen content of corn may be reduced to an extremely low figure, and at the same time the yield of the new strains may be greatly reduced instead of increased. Hence the breeders must keep their eyes open for other controlling factors.

Recent work by Evans in Mauritius has pointed to a factor that has hitherto been neglected or overlooked: if cane breeding for higher yields of a growing plant is to accomplish a large amount of growth it must have an apparatus that will enable it to obtain the largest possible amount of nourishment from the soil, in other words it must have an efficient root system. An efficient root system in this sense means an abundance of fine hair-roots that in the aggregate have a large absorbing surface. Evans found that P. O. J. 2878 has a root system that contains a much larger proportion of fine roots than other varieties, and is thus able to extract a larger proportion of plant food and water from the soil. This feature, together with a relatively low nitrogen content, explains why P. O. J. 2878 has earned the reputation of a "Wonder cane" in all countries into which it has been introduced.

This goes to show that perhaps the breeders have not yet learned to recognize all the characteristics that mark the high-yielding varieties, but in proportion as such characteristics are identified the Principle of Least Work will continue to lead toward the point of maximum yields with minimum expense in land, labor, and materials.

In the search for higher yielding varieties of sugar beets the same ruling principle of low nitrogen content still

holds good, but as in the case of the sugar cane, low nitrogen in beets must be accompanied by other essential features. Among such features of productive beet varieties that have begun to impress themselves on the beet breeders is a small ratio of leaves to root, in the sense that,—other things being equal, the beet variety with the fewest and smallest leaves is the greatest yielder of sugar per acre.

At first sight such a proposition may appear "contrary to nature." It is generally known that the leaves of plants are the organs that carry on all the vital processes; they assimilate the carbon dioxide of the air; and it is in the chlorophyll cells of the leaves that sugars and other plant products are synthesized. From this it is logical to conclude that the more leaf surface a plant has the more intensive would be the assimilative processes, and the greater the yield of plant substance.

But actual experience with sugar beets now proves that it is not so much a matter of quantity of leaf surface as of quality. The chlorophyll cells of a small leaf may be far more active than those of a large one and may support the growth of a larger root. Hence the breeder does well to select along the line of small leaf crown, while at the same time trying to maintain a low percentage of nitrogen. By keeping the nitrogen low, one condition for a large total production of vegetable substance is provided; and by keeping the leaf crown small, it is assured that a larger proportion of the total substance will go into the root. It is as simple as that in principle, although more or less difficult in practice.

It is such breeding work that offers the sugar industry the greatest chances of success in its continual pursuit of the Principle of Least Work. Every increase in the "quantity of life" possessed by a sugar beet or a sugar cane variety means more sugar from the same area of land, the same amount of plant food, and the same number of man-hours expended in preparing the ground and cultivating the crop. Hence no one need be surprised at the time and expense devoted in all progressive sugar producing regions to breeding for new seedlings or varieties. Every year, hundreds of new cane seedlings are released for commercial cultivation and some of them have given promise of displacing even such notable varieties as H. 109 and P. O. J. 2878.

Disease Resistance

Of course. it is not sufficient to have a high-yielding variety; besides a large ability to produce sugar it is necessary that the plants be able to resist diseases and pests. The search for resistant varieties occupies a large share of the time and effort of the plant breeders. In the case of the sugar cane it has lately become possible to say that while no variety of cane is known that will resist all diseases, it is possible to suppress any cane disease by planting a variety that is resistant to it. Hence the sugar cane industry has a nearly perfect insurance against the disease hazard. And it is now almost possible to say the same as regards the sugar beet industry. The curly-top disease has been practically ruled out of beet agriculture in the United States by the creation of resistant varieties, which continue to give a good account of themselves.

Cercospora or leaf spot disease, which is the other principal scourge of the sugar beet in the United States, also appears on the way out. In the breeding work that resulted in varieties resistant to curly-top, one strain, U. S. 217, has conclusively shown leaf spot resistance and further developments may no doubt be expected.

"Rots" and Moth Borers

There still remain a number of beet diseases known as "rots," some of which are caused by microorganisms or fungi, while others are due to soil deficiencies. Among these, heart rot or black rot is now proven to be due to unbalanced nitrogen nutrition (Schmidt) which may be corrected by addition of borax to the soil. Other soil deficiencies have been found correctives in the addition of small amounts of zinc or manganese. As regards the fungus rots the remedy is being sought, and apparently with some chance of success, in the same way as in the struggle against curly-top and cercospora, namely by a search for resistant varieties, a method which has given distinguished results with the sugar cane.

It is interesting to note that the sugar cane breeders have lately found that they can even afford some protection against the ravages of the moth borers that are the principal insect scourge of this crop. The young borer larvae that hatch out on the leaves migrate to the stalk and bore into it. If the stalk happens to have a tough rind the larva fails to penetrate. At any rate it is now proven that those cane varieties with the hardest rinds are the smallest sufferers from borer damage. The breeders have taken the hint, and now add hardness of rind as qualifying test on new cane seedlings.

Disease resistance, drouth resistance, borer resistance, and frost resistance, are all objectives at which the cane breeders are ceaselessly aiming. While these objectives are important in themselves, they are subordinate to the main proposition: to procure new varieties with larger and larger quantities of life, which is now known to be associated with low nitrogen content.

Beet Breeding

However, success in breeding depends to a large extent in making crosses that will give new strains with a larger number of what the geneticists describe as "chromosomes." When breeding work is confined to a single species, as the common sugar beet (*Beta vulgaris*) or the "noble" sugar cane (*Saccharum officinarum*), there is not much chance of juggling the chromosomes, but this may be done by crossing with another species. It has recently been announced that definite crosses between common sugar beets and wild beets have shown a doubled number of chromosomes and that these crosses are characterized by large cells, a sure sign of greater potential yielding ability. It now remains to be seen whether the breeders will be able to fix these characteristics in a commercial beet variety. If they do, and it is more than likely that they eventually will, we can look forward to greatly increased

acre-yields of beet sugar. How large these future yields may be it is not now possible to say. The present sugar beet has a potential yielding ability of about 54 tons to the acre. The highest authenticated yield to date is held by a Russian experiment station, which has reported a peak of 48.78 tons. When we get new beet varieties with a doubled chromosome number and larger cells even this yield figure might be doubled.

Cane Breeding

The cane breeders are also on the hunt for more chromosomes, which they have found by crossing the noble canes with wild species and are now busy in trying to translate the results into larger yields. The most spectacular of their crosses has been between the sugar cane and the bamboo, which is the more remarkable because the parents belong not only to different genera, but also to different sub-families of the Gramminal. We forbear even to imagine what may be the final result of thus fusing the sugar-producing ability of the sugar cane with the low nitrogen and enormous vigor of growth of the bamboo.

We may also note that the breeders are preparing to extend the cane sugar industry from the tropics to the temperate zones. One step has been taken by crossing sugar cane and the sweet sorghum, whereby rapidly growing hybrids rich in sugar have been obtained. These hybrids, however, require further perfection before becoming commercially valuable. Another step has recently been taken by the discovery of wild canes that will survive hard frosts and low temperatures. When (and if) these qualities are conferred on new commercial varieties, the production of cane sugar may become possible over a much larger extent of the earth's surface.

Mechanical Improvements

While waiting for the plant breeders to produce better and better varieties, the practical man in the fields has to do the best he can with the varieties he has; and whether the variety is a good or a poor one he is under the ever present necessity of applying the Principle of Least Work in all possible directions.

It is a curious fact that although the culture of the sugar cane and the sugar beet can look back on a respectable antiquity, new methods and machinery for field work are continually being introduced, and it is also curious to note that many of these methods might just as well have been put to use years ago. In the cultivation of the sugar beet, for instance it is only recently that the old practice of cross blocking has been introduced. By this method a cultivator is sent across the rows to chop out portions of the drilled beets, leaving small clumps, which facilitates the work of thinning. Now comes a method (in itself quite old) of planting the beets in checkerboard fashion, thus making a separate blocking operation unnecessary. Another refinement aimed at reducing the high labor cost of thinning is to plant beet seeds at regularly spaced intervals (1 to 1½ inch), so that after blocking there is little or no thinning to be done.

The other end of the beet crop still awaits the perfect beet harvester, but the Scott-Viner Machine continues to show itself as a very promising development in this field. Inventors of beet harvesting machinery have lately been very active in Germany, where until a very short time ago the accepted practice was to dig the beets by hand. The Germans, in fact, have produced new types of beet harvesting machinery not yet found in the United States. Inventors of cultivating implements have been active in both sugar cane and sugar beet agriculture. The particulars of their inventions are too numerous to be recorded here, but all together they contribute to saving labor and lowering costs of cultivation. An especially notable application of the Principle of Least Work is a system whereby two cultivators are pulled by one tractor, so that three men can cultivate 100 acres of beets in a day.

Fertilization and Irrigation

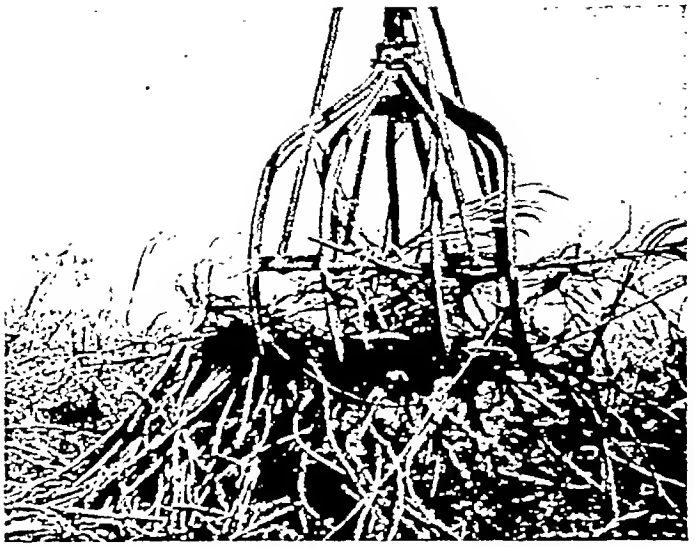
During the past year efforts to put the fertilization and irrigation of beets and cane on a more scientific basis have continued although this movement has not yet spread far beyond a few progressive regions. The Hawaiian planters have still further perfected their system of rapid methods of chemical soil analysis (RCM) by which reliable information is obtained on which to base a rational program for the use of fertilizers. On the opposite side of the earth, namely in Sweden, the sugar factories have perfected a soil analysis service which puts in the hands of every beet farmer a picture of the chemical situation of his soil. The results of this service have been distinctly profitable both to the sugar factories and the farmers. Similar services are being organized in a few other countries. How long it will take for sugar factories and farmers generally to unite in such movements it is impossible to say, but here is obviously a good place for profitable application of the Principle of Least Work.

Recently a similar common sense method has been applied in the ancient art of irrigation, which for ages has been conducted mostly on a guesswork basis. Now it is being recognized that irrigation water must be supplied in the right amounts and especially at the right times. In order to be able to judge the right time the farmer should have some idea of the amount of moisture in his soil at all times, so that he may replenish the supply before the crop begins to suffer. This idea appears to have been developed simultaneously in Hawaii and California where services have been organized for frequent soil tests to show the rate at which moisture is being depleted. These services are organized to cover whole regions, and furnish an invaluable guide to every farmer in the region.

Beet Technologists' Society

As an indication of the rising interest in the science of sugar production we may note the formation of an American Society of Sugar Beet Technologists. Plans are on foot for formation of one or more technologists associations in the West Indies sugar cane industry. Eventually, no doubt, the technologists of every sugar producing region will be organized, the better to bring science to bear on their common problems.

In view of existing trends it will be natural to ask



Grab Harvesting: The Grab Pulling Cane From the Soil.

what we may expect to see when sugar agriculture has been put under complete scientific control; or to put it another way, when the Principle of Least Work has been carried as far as possible. From what we can now see it is not too visionary to predict that when all visible trends have reached their logical culmination we shall find beet and cane farmers regularly producing more than 15 tons of sugar to the acre on fields so completely mechanized that not a single operation need be carried out by hand labor.

Factory Problems

It is an old saying that "sugar is made in the fields and not in the factory." No factory technologist can get more sugar from cane or beets than nature (assisted by the farmer) has put into them. Therefore the field is the first place to look for more sugar at less cost. But the factory men must also look for places and occasions for applying the Principle of Least Work. They have to take the material that is presented to them, and have to assume the obligation to extract the sugar in the most economical manner possible. The art of extracting sugar from cane and beets is now an old one, but every year sees more or less important advances in it.

One of the main difficulties of the sugar factory technologist arises from the fact that he has to accommodate himself to the more or less drastic proceeding of his agronomic brethren in the fields, who have lately made some revolutionary applications of the Principle of Least Work to their own business. This is strikingly illustrated by the revolution in cane harvesting methods that has occurred in Hawaii. Here the field men have found that by attaching a "grab" to a crane mounted on a tractor they could harvest and load cane mechanically, thus dispensing with the large amount of labor involved in cutting, topping, piling and loading the cane by hand. From the agricultural standpoint this is a very notable application of the Principle of Least Work, but at the same time it imposes disadvantages on factory operations, due to the fact that the grab harvester delivers cane in the untopped condition along with large amounts of trash, dirt, and stones. These foreign materials have imposed the necessity of enlarging mill facilities, especially in the juice purification department.

This illustrates the fact that application of the Principle of Least Work may lead to new economies in one direction while creating new expenses in another. However, in this case the net gain from grab harvesting is so large that the extra expense in the factory is relatively unimportant. At the same time it is to be noted that this balancing of larger savings in one operation against increased expense in another operation is possible only where the agricultural and factory operations are under single ownership or management. This may be an argument for the cooperative operation of sugar factories generally.

Refractory Cane Juices

Another case where success in the application of the Principle of Least Work in the sugar cane agriculture has raised difficulties for the factory technologists is the introduction of new, high-yielding varieties which furnish juices that are "refractory," in the sense that they are very difficult to purify unless very large settling capacity is available. Here again what is gained in the field more than compensates for what is lost in the factory, provided that field and mill are under the same management. If the management is in different hands neither the farmers nor the mill men can enjoy the full benefits that are given by such varieties as P. O. J. 2878.

This is usually not the case in many regions where P. O. J. 2878 is grown, and the mill operators have been driven to find their own ways of applying the Principle of Least Work to refractory P. O. J. 2878 cane juice. After much effort it seems that a satisfactory process has been found for these juices in what has come to be known as the "fractional liming and fractional heating" method. This is in part an application to cane juice of the fractional defecation process that is now making its way through the European beet sugar industry. In both cases the principle involved is that beet or cane juice contain colloidol substances of different natures, all of which coagulate at different degrees of pH and at different temperatures. By adding lime in successive stages, (instead of the common practice of adding all the lime at once) first to the cold juice and at a later stage after the juice has been heated, the troublesome qualities of P. O. J. 2878 juice largely disappear.

Compound Clarification

Aside from the "fractional liming and double liming" process, the variety P. O. J. 2878 has stimulated other efforts to apply the Principle of Least Work to juice clarification. Compound clarification according to Petree and Dorr has given excellent results from the standpoint of colloid elimination. A process employed at Central Morón in Cuba appears to have obvious advantages in treating both refractory and normal juices. In this process the juice from the crusher and first two mills ("A" juice) is kept separate from the more impure juice of the last three or four mills ("B" juice). Water only is used for macerat-

ing, the syrup from the "B" juice being used exclusively for exhausting massecuite. This avoids distributing all the impurities throughout the whole body of juice. Other recent clarification systems, as the Fortier, the Diaz and the Gilchrist systems seem to be giving good accounts of themselves.

Even at that, the tendency is to use much more clarifying equipment with P. O. J. 2878 juices than with the older, less refractory canes, but in spite of the extra expense there is no disposition to return to the less productive varieties.

New efforts to develop chemical methods of cane juice clarification have not been lacking. More and more factories have gone to the use of sulphur in handling refractory juices. The use of sulphur dioxide in conjunction with phosphoric acid has been especially recommended. A suggestion from Hawaii is the use of ammonium phosphate ("Ammo-Phos"). The special effect of this chemical appears to be associated with the liberation of ammonia in the presence of lime; this is thought to produce a local and momentarily high alkalinity that helps to coagulate colloids and other suspended matter.

Filtration Progress

After a juice has been chemically or otherwise treated for clarification it must be filtered, and attempts to apply the Principle of Least Work to this department are numerous. Considerable advances in the use and operation or rotary vacuum filters of the Oliver type have been made. But the chief advances in filtration have not been made so much by improving the filters themselves, as in the production of settlings and muds that have excellent filtering qualities. This is one of the advantages of fractional liming and heating in both the beet sugar and the cane sugar industries—the precipitates not only settle readily but filter rapidly. Fractional liming has been a conspicuous success in the beet sugar industry. In this industry the principles of the liming operation now appear to be pretty definitely fixed, so the researchers and inventors in this department have turned their attention to the construction of devices that make the liming operation completely automatic.

Although the filter technicians have not been able greatly to improve the filter, they have considerably improved the standardization of filter operations so as to make sure of securing the most efficient operation of the filter, first by devising micro methods (Dedek) for quickly measuring the filterability of precipitates and again by devising methods for rating filter performance. In other words, the control of filter operations has been put on a fairly accurate basis for the operating superintendent who is sufficiently interested in maximum efficiency.

Evaporator Operation

In every sugar factory or refinery the evaporation department is one of the most important and has continued to be the object of many attempts at improvement. One of the main requirements of an evaporator is that it shall be economical in the use of heat, which means that it should handle the largest possible amount of juice in proportion to its size and cost. In the main this is a matter of heat transmission through the metal walls that separate the juice and the heating steam.

The lead in investigations on this problem has been taken by the veteran beet sugar technologist H. Claassen, who, though past 80 years of age is still making important contributions to the subject. Many of his ideas have been embodied in an invention known as a compound evaporator which has been introduced into new European factories with apparently satisfactory results. Much of the success of such evaporators appears to be due to judicious proportions between vapor and juice, to internal baffling arrangements, and especially to arrangements for complete elimination of dead spaces in the steam chamber.

Another of the problems of evaporator operation to receive effective attention is the prevention of incrustation. This is something that ideally is a charge on the juice purification department, which is supposed to deliver a thin juice from which all incrusting elements have been removed. This ideal is not always attained, and in many cases lime salts and other incrustants reach the evaporators and are deposited in the heating surfaces. Lately trisodium phosphate and ammonia has come to notice as a mixture that will completely eliminate lime when added to the juice in the final purification operation (after liming and carbonating).

Another way of reducing incrustation that has lately come into much prominence is the addition of a decolorizing carbon to the thin juice before entering the evaporators. This operation has been given considerable prominence since the invention of a new kind of decolorizing carbon, known as Collactivit. It is produced by the action of concentrated sulphuric acid on sawdust or similar waste vegetable matter. The wet carbon thus obtained is mixed with the thin juice and filtered out of the thick juice. Extensive trials with this process have shown that not only is incrustation of the heating surfaces greatly reduced but also that the color is greatly improved and the purity notably increased, because the carbon has the property of absorbing melassigenic salts.

Sugar Boiling

The sugar boiling station, where the thick juice from the evaporators is converted into massecuite for the crystallizers, continues to receive large attention from investigators and inventors, chiefly on two main points—the promotion of circulation inside the pan, and the automatic control of the sugar boiling process. On the question of maintaining circulation in the pan there are two sharply divided opinions. On the one side are such experts as Claassen who insist on "natural" circulation by proper construction and arrangement of the coils or tubes, assisted by judicious injections of steam at the bottom of the pan. On the other side are inventors like Webre who resort to

mechanical stirring of the mass. It appears to be a fact that good results can be obtained by either method. The advocates of mechanical stirring have the advantage of simplicity on their side. When a massecuite is stirred it must circulate in any vacuum pan of the usual type, whereas the theoretical basis of natural circulation has not yet been completely worked out.

Automatic Boiling

In the field of automatic control of the sugar boiling operation, activity has largely passed from a search for the basic physical principles to the perfection of apparatus for making practical use of these principles. These apparatus are of two principal forms, one depending on measurement of the electrical conductivity of the boiling massecuite, and the other on the difference between the boiling points of pure water and that of the massecuite. In both these methods the object is to make the operation of pan-boiling independent of the personal judgment and skill of the professional sugar boiler by automatic control of temperature, pressure, syrup and steam supply. Control apparatus for all these purposes are now available in more or less standardized forms.

However, complete automatization of pan boiling has not yet been attained, unless certain statements in Russian sugar journals prove to be true. It is said that Russian sugar technologists have perfected a system of sugar boiling which merely requires the attendant to turn on the steam and turn it off when the instruments show that the cook is finished. No details have been furnished.

In the operation of crystallizing the massecuites the cooler-crystallizers of the Lafeuille and Werkspoor types continue to justify themselves. A new application of an old principle of crystallizing has been introduced in the De Vries Crystallizer, where the crystals are formed in successive stages of constant supersaturation. This system is now well advanced in the experimental stage.

Centrifuging Advances

The operation of centrifuging, by which the sugar crystals are separated from the mother liquor continues to receive the attention of investigators and inventors. It has now been generally agreed that the high speed centrifugal, operating up to 1800 revolutions per minute, has come to stay because of its effectiveness in throwing out the syrup or molasses. Also, certain other matters connected with centrifugal operation have been given more attention. One of these relates to the viscosity of the mother liquor, because the lower the viscosity the more complete is the expulsion of the molasses. On this point opinions have differed as to the best method of viscosity reduction—whether to make the massecuite thinner by heating it or to make it thinner by adding water. Recent experimental work seems to show that the dilution method is the more effective in syrup elimination and purity increase without loss of sugar, but this method appears to be somewhat more difficult to apply than the heating method. Definite choice between the two methods awaits further experience in particular cases.

Another important suggestion on sugar centrifugal operation comes from Hawaii. A massecuite going into a centrifugal may have a desirable viscosity, but when the machine begins to spin, powerful air currents are set in motion and within a very short time the mother liquor is noticeably concentrated, which of course increases the viscosity and impedes elimination of the molasses, hence the sugar obtained has a relatively low purity. This undesirable effect is counteracted by conditioning the air in contact with the sugar so that it will have a humidity of 100 per cent, thus effectively preventing any concentrating of the mother liquor. Factory experience with this method, which involves only blowing a proper mixture of steam and air within the basket, has shown increases of 5 to 10 points in the purities of low grade centrifugal sugar.

Utilization of By-Products

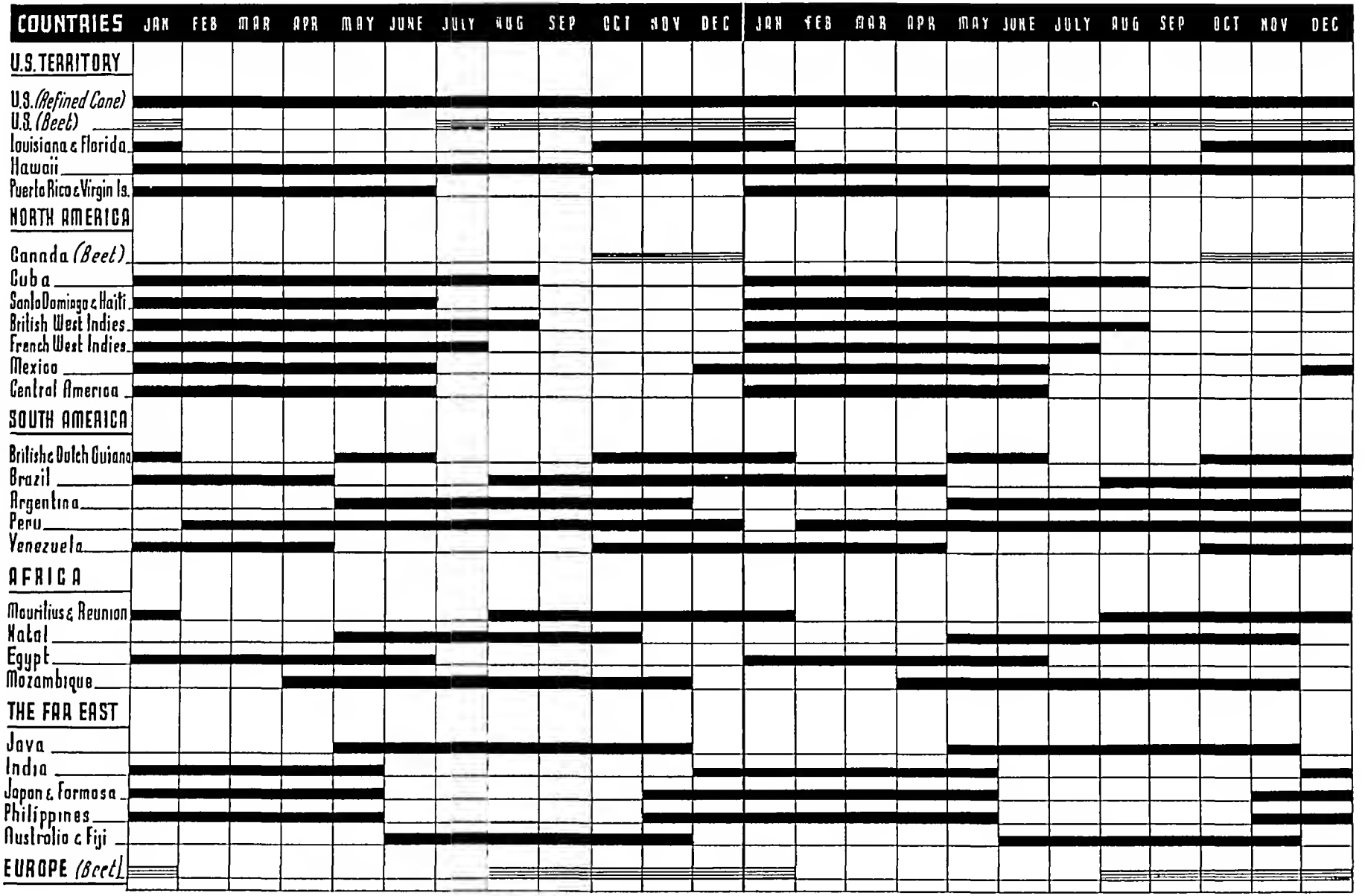
An ancient problem that still attracts much attention is the utilization of by-products of the sugar industry, especially cane molasses. In a number of cases the problem is solved by turning the molasses into absolute alcohol for use as a motor fuel. The use of cane molasses as a raw material for yeast productions for stock feeding purposes is being closely studied in Hawaii, where a special molasses research laboratory has been installed. One achievement of this laboratory has been a method for producing high grade lactic acid in good yields. Another is a method for producing levulinic acid, also in large yields. The next problem is to find a larger industrial use for these products. The Indian sugar technologists have contributed a method of converting molasses into an acceptable material for road construction. They have also found molasses to be a very effective agent for making fertile soils out of alkali land.

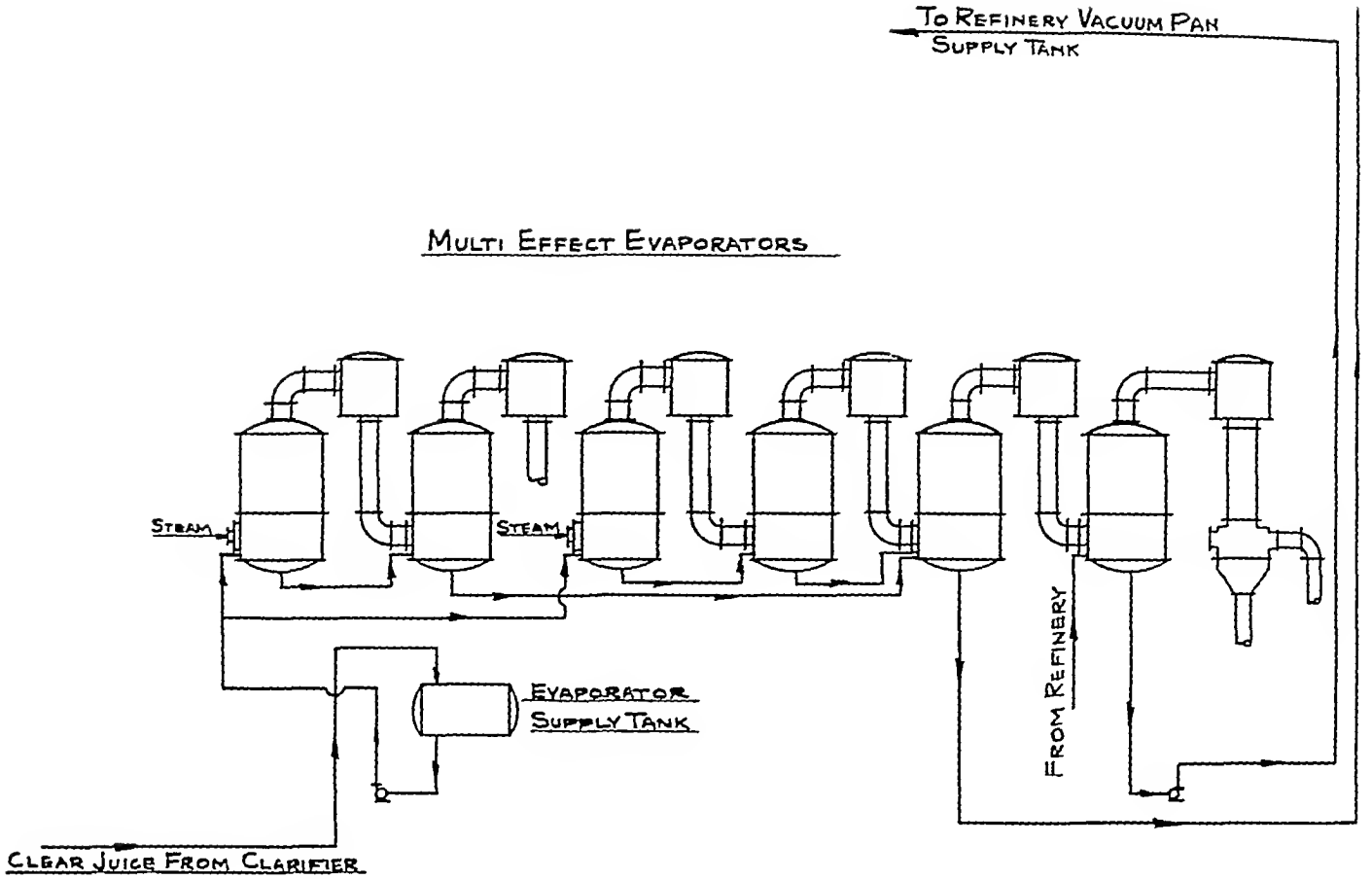
The Germans have bestowed much attention on the problem of conserving the feed values in beet tops by drying them on a large scale. For this purpose they have developed methods and machinery that are adequate for the purpose and which may serve as models for use in other countries where this valuable raw material is now wasted.

Another interesting line of research on the utilization of molasses as a stock feed is being developed in Germany, where there is a shortage of albuminous feeds. This idea is based on the fact that whereas animals are not able to convert inorganic nitrogen into protein, microorganisms do possess this ability. Hence if molasses is mixed with ammonia compounds or urea and fed to ruininants (cows, sheep) these compounds will be converted into protein in the first stomach of the animals and the protein will then be digested in its subsequent progress through the digestive tract. Encouraging results have been obtained.

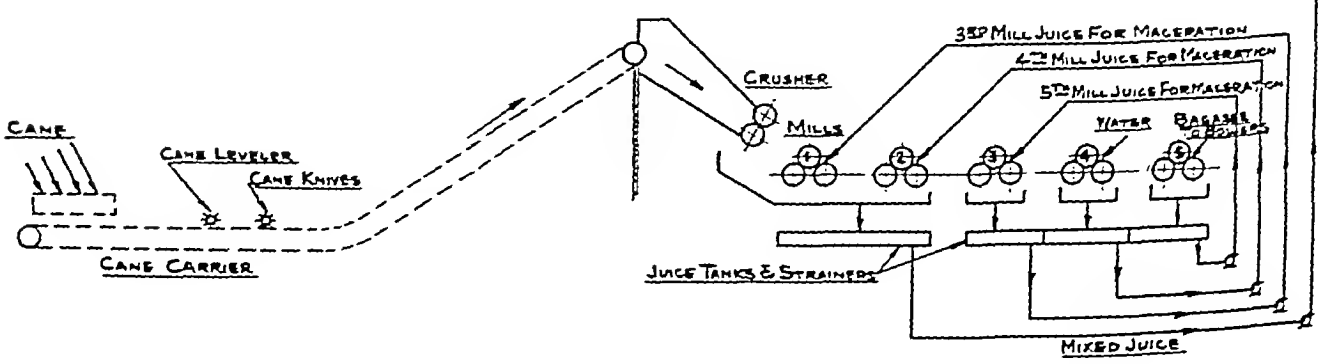
Closely related to the problem of utilizing molasses is the problem of disposing of surplus cane that, on account of market conditions, cannot be used for producing sugar. One way is to crush the cane to obtain the juice, which is then treated with acid to produce "invert syrup," which is sold to producers of industrial alcohol. In this way a considerable outlet is found for surplus cane in Cuba and Brazil, for instance.

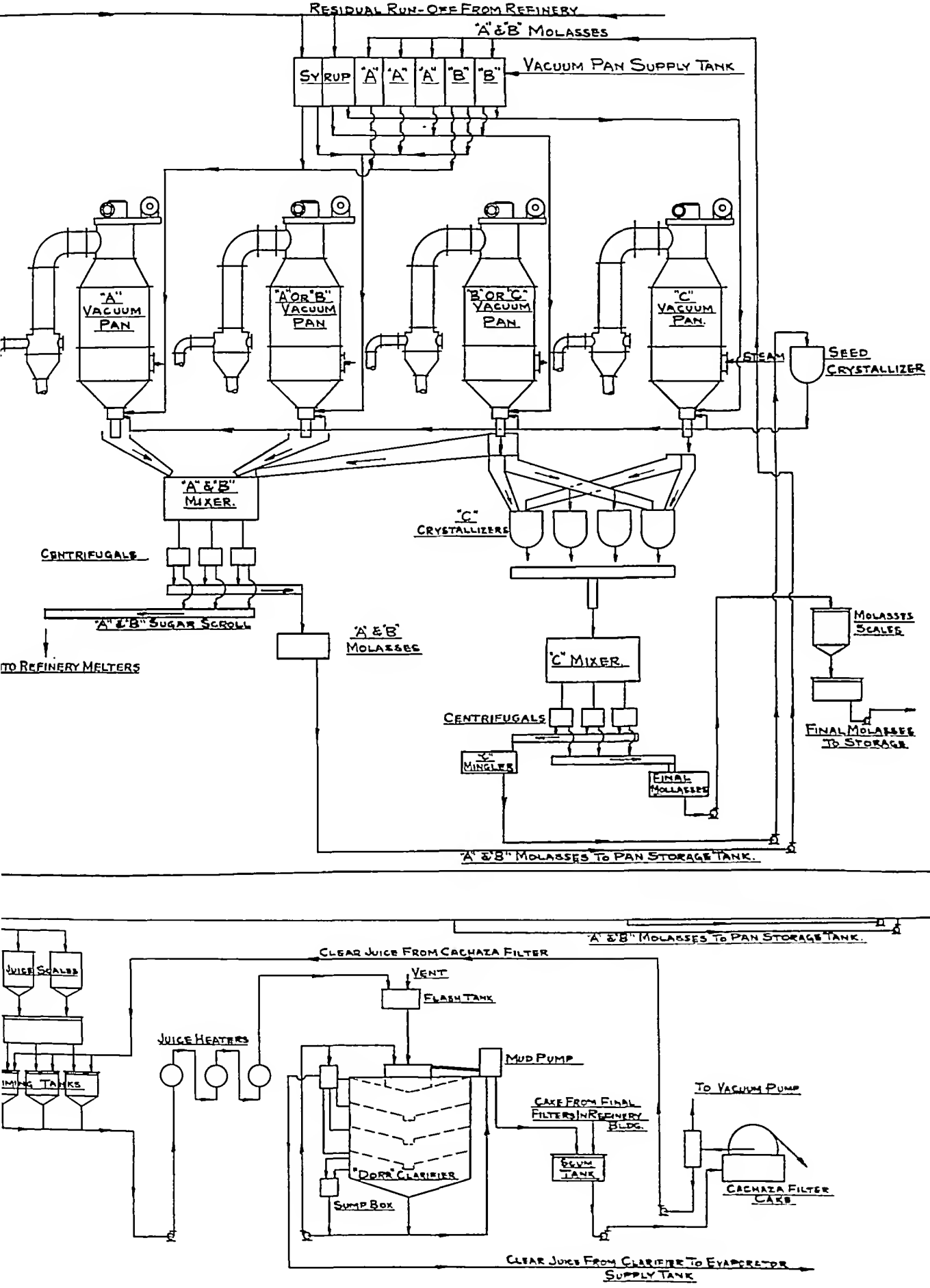
Crop Seasons in the Sugar Industry



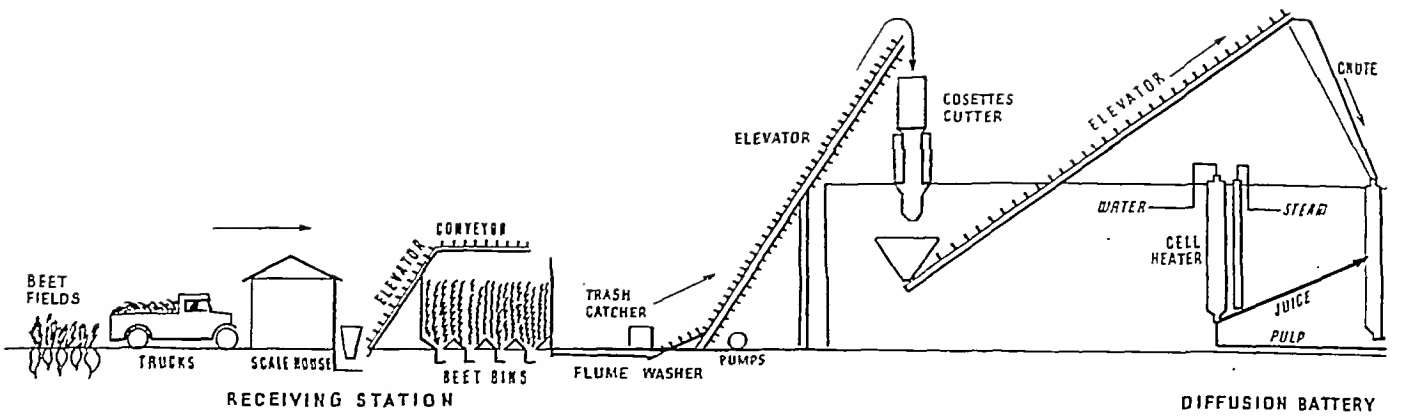


Process Flow Sheet for Raw Sugar House

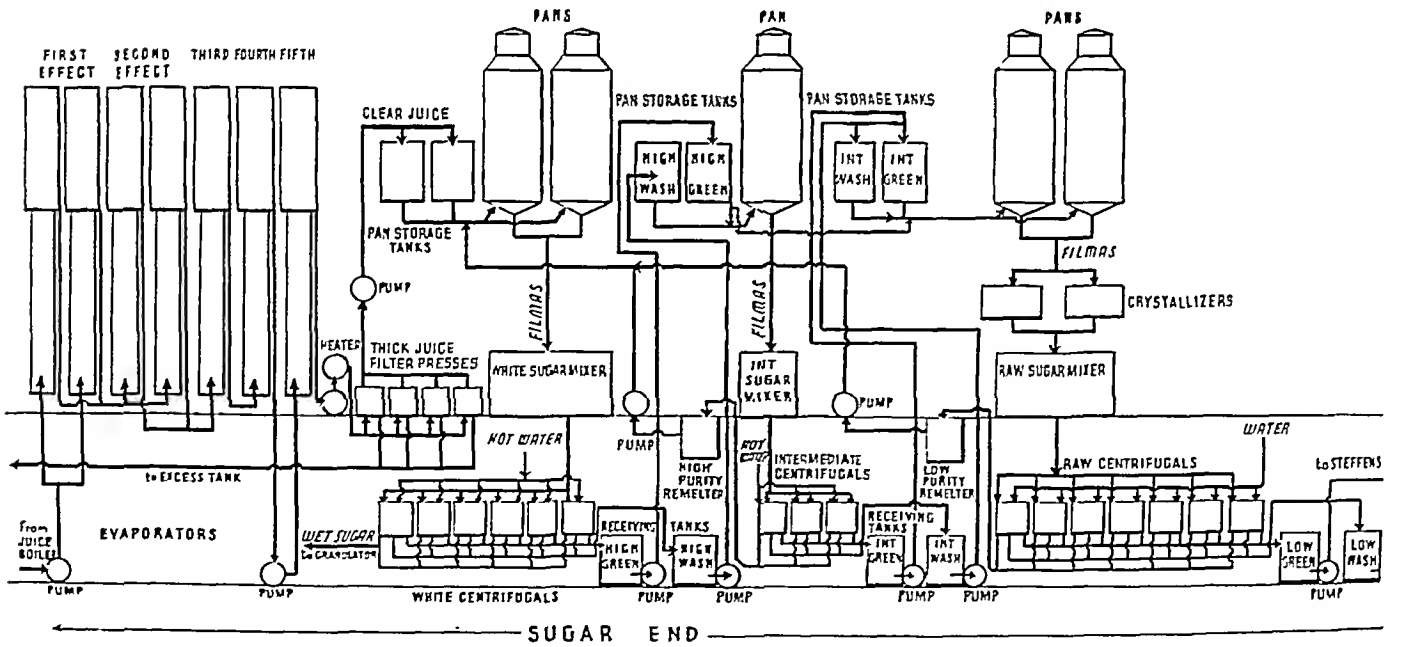


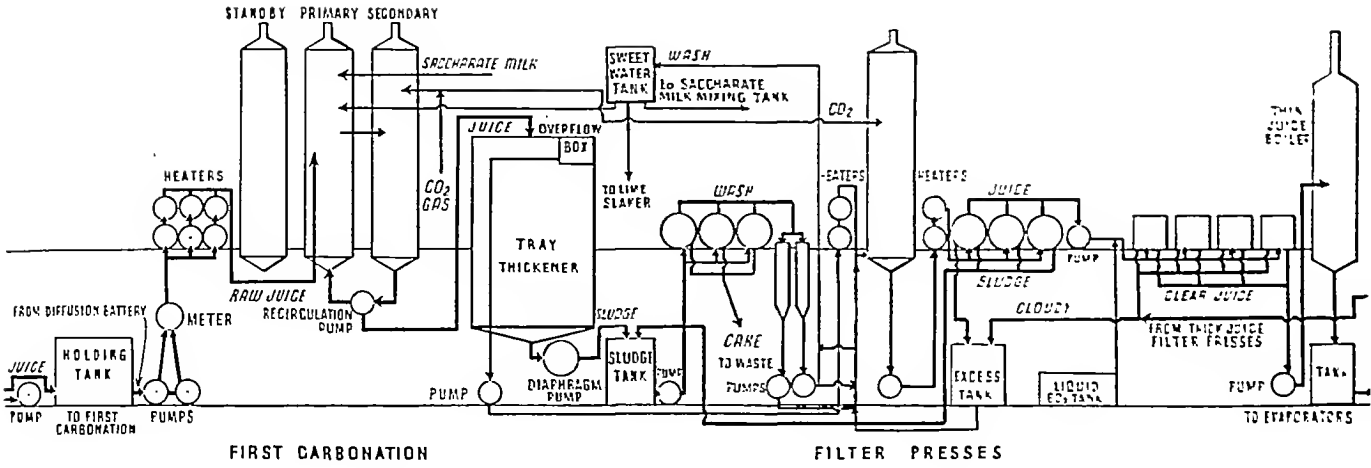


~ Process Flow Sheet For Raw Sugar House ~

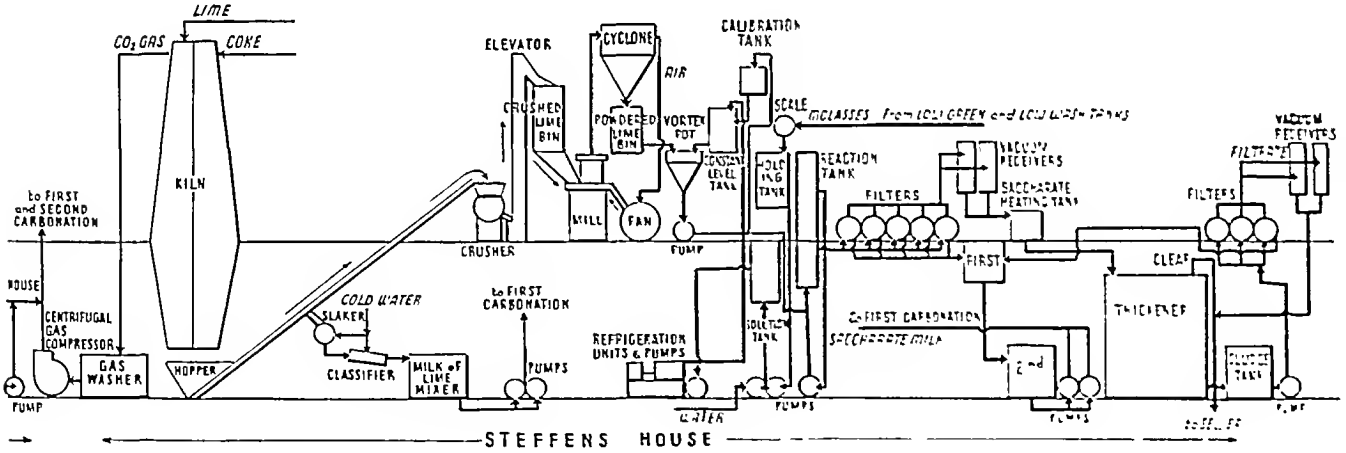


FLOW CHART OF BEET





SUGAR FACTORY



Wholesale and Retail Refined Sugar Prices

(In Cents per Pound)

ABOUT half of the wholesale and retail prices quoted below include duties and taxes. These are listed on another page under "Sugar Tariffs in Other Countries." The countries whose prices include taxes are: Brazil, Czechoslovakia, Egypt, Germany, Eire (Irish Free State), Mexico, Norway, Poland, and Switzerland. Poland's retail price includes basic cost, excise tax, turnover tax, handling charges, jobber and retailer profits, and, since 1933, a labor fund tax. Brazil has an export tax for interstate shipments and an import tax which is higher than the total retail price. The German wholesale price includes consumption and sales taxes.

Year	Wholesale	Retail
Argentina:		
1931	5.4	4.8
1932	3.9	4.3
1933	4.9	5.2
1934	4.0	4.2
1935	4.5	4.7
1936	4.9	5.0
1937	.....	5.1
Australia:		
1931	6.20	6.98
1932	4.85	5.45
1933	4.40	4.95
1934	6.03	6.78
1935	5.70	6.41
1936	5.81	6.54
1937	5.83	6.55
Austria (German Austria):		
1931	9.21	9.91
1932	9.43	10.17
1933	9.99	10.73
1934	9.99	11.10
1935	9.99	11.10
1936	9.99	11.10
1937	9.43	10.54
Brazil:		
1931	2.43	3.64
1932	2.50	3.56
1933	3.66	4.16
1934	3.36	4.48
1935	3.38	4.40
1936	3.30	4.40
1937	3.30	4.40
British Guiana:		
1937	14.00	16.00
Bulgaria:		
1931	7.98	8.09
1932	7.10	7.58
1933	8.18	8.36
1934	11.93	13.33
1935	11.90	12.55
1936	11.90	12.51
1937	12.11	12.44
Canada:		
1931	4.56	5.7
1932	4.28	5.2
1933	6.37	7.1
1934	6.18	7.0
1935	4.90	5.8
1936	4.61	5.7
1937	4.99	5.7
Chile:		
1931	5.89	6.27
1932	4.32	4.61
1933	6.87	7.15
1934	10.04	10.45
1935	7.50	7.84
1936	5.04	5.22
1937	5.12	.....
China:		
1931	3.40	.....
1932	4.10	.....
1933	3.71	.....
1934	4.99	.....
1935	5.16	.....
1936	4.93	.....
Costa Rica:		
1931	2.50	3.0
1932	1.59	2.3
1933	2.19	2.5
1934	3.86	5.0
1935	2.75	5.0
1936	2.25	2.5
1937	2.57	3.0
Cuba:		
1931	2.00	2.70
1932	2.35	2.90
1935	2.75	3.00
1934	2.52	2.90
1935	2.06	3.20
1936	3.06	3.50
1937	3.16	3.50
Czechoslovakia:		
1932	7.72	8.08
1933	8.60	8.99
1934	10.86	11.36
1935	10.89	11.39
1936	10.82	11.32
1937	8.55	9.78
Danzig:		
1931	11.95	18.16
1932	11.95	18.16
1933	11.95	18.16
1934	11.95	18.16
1935	11.95	18.16
1936	9.41	10.36
1937	9.41	10.36
Ecuador:		
1931	3.3	3.9
1932	3.0	3.3
1933	2.9	3.3
1934	1.8	2.4
1935	2.0	2.4
1936	2.2	2.4
1937	2.2	2.8
England:		
1931	4.48	5.05
1932	2.99	3.42
1933	3.33	3.57
1934	4.29	4.29
1935	4.10	4.10
1936	4.19	4.19
1937	4.15	4.15
Egypt:		
1931-37	4.53	5.09
Finland:		
1931	8.75	9.73
1932	6.60	7.16
1933	7.03	7.67
1934	8.85	9.17
1935	8.01	8.75
1936	7.43	8.16
1937	6.87	8.38
France:		
1931	6.50	6.80
1932	6.60	6.80
1933	8.50	8.60
1934	6.40	11.30
1935	9.80	10.40
1936	9.30	9.50
1937	8.28	9.02
Germany:		
1931	4.54	6.26
1932	4.57	7.67
1933	5.33	9.19
1934	7.71	13.29
1935	7.67	13.29
1936	7.67	13.46
1937	7.63	13.29

Year	Wholesale	Retail
Guatemala:		
1931	3.94	7.00
1932	2.95	5.00
1933	3.44	7.00
1934	3.94	7.00
1935	3.69	7.00
1936	3.69	6.00
1937	3.69	6.00
Honduras:		
1931		
1932		
1933		
1934		
1935		
1936		
1937		
Hungary:		
1927-37	4.25	11.49
India:		
1931	10.98	
1932		
1933	5.75	
1934	5.51	
1935	5.62	
1936	4.16	
1937	5.95	
Irish Free State (Eire):	5.605	
1933	5.37	5.195
1934		
1935	4.50	
1936	6.11	5.00
1937	6.62	6.19
	6.22	7.20
	6.22	7.40
		7.20
Italy:		
1931	14.8	15.4
1932	14.4	15.0
1933	17.2	17.9
1934	23.8	24.4
1935	23.4	24.0
1936	21.4	21.7
1937	14.1	14.5
Japan:		
1931	4.72	7.79
1932	2.79	4.24
1933	3.45	4.54
1934	5.28	4.85
1935	5.36	4.66
1936	3.41	4.87
1937	4.28	5.51
Java:		
1931	2.04	2.50
1932	1.59	2.50
1933	1.48	2.50
1934	1.87	2.50
1935	1.98	2.50
1936	1.98	2.50
1937	2.04	2.50
Jugoslavia:		
1931	9.00	10.00
1932	9.00	10.00
1933	9.00	10.00
1934	12.00	15.00
1935	11.00	12.00
1936	10.00	11.00
1937	11.00	12.00
Mexico:		
1931	2.52	5.00
1932	2.39	5.00
1933	3.08	5.28
1934	3.24	5.52
1935	3.21	5.52
1936	3.21	5.52
1937		
Netherlands:		
1931	6.20	7.18
1932	6.00	7.05
1933	8.84	10.00
1934	13.89	15.80
1935	12.57	14.06
1936	12.31	14.02
1937	10.44	11.54
Norway:		
1930	5.5	7.0
1931	4.8	6.0
1932	4.2	4.7
1933	5.5	6.0

Year	Wholesale	Retail
1934	6.4	7.4
1935	6.4	7.4
1936	5.5	6.5
Panama:		
1931-37, Average	9.45	7.50
Peru:		
1931	2.52	3.50
1932	2.11	3.50
1933	1.87	3.50
1934	2.26	3.71
1935	2.25	3.71
1936	2.91	3.71
1937	2.91	3.19
		3.55
Poland:	8.18	
1931	7.41	8.56
1932	9.55	7.57
1933	10.35	9.17
1934	8.21	10.70
1935	8.17	8.56
1936	8.50	8.55
1937		8.00
Portugal:		8.56
1931		9.75
1932		7.15
1933		9.21
1934		8.03
1935		8.93
1936		9.02
1937		
Rumania:		
1931		10.14
1932		
1933		9.17
1934	10.90	12.70
1935	12.70	13.10
1936		
1937		
South African Union:		
1932		
1933		
1934		
1935		
1936		
Sweden:		
1931		
1932		
1933		
1934		
1935		
1936		
1937		
Switzerland:		
1932		
1933		
1934		
1935		
1936		
1937		
Turkey:		
1931		
1932		
1933		
1934		
1935		
1936		
1937		
Uruguay:		
1931		
1932		
1933		
1934		
1935		
1936		
1937		
Venezuela:		
1931		
1932		
1933		
1934		
1935		
1936		
1937		

United States Sugar Tariffs, 1789-1938

1789, Act of July 4.—Brown sugar, 1 cent per pound; loaf sugar, 3 cents; other sugar 1½ cents.

1790, Act of August 10.—Loaf sugar, 5 cents; brown sugar, 1½ cents; other sugar 2½ cents.

1794, Act of June 5.—Refined sugar, an additional 4 cents. Other duties same as in Act of 1790.

1795, Act of January 29.—White clayed or white powdered sugar, 3 cents; all other clayed, 1½ cents.

1800, Act of May 3.—On brown sugar an additional ½ cent.

1816, Act of April 27.—Brown sugar, 3 cents; white clayed or powdered sugar, 4 cents; lump sugar, 10 cents; loaf and candy sugar, 12 cents.

1832, Act of July 14.—Brown sugar and sugar cane syrup, in casks, 2½ cents; white clayed sugar, 3⅓ cents.

1842, Act of August 30.—Raw sugar and brown clayed sugar, 2½ cents; all other sugars, not refined, 4 cents; refined sugar, 6 cents.

1846, Act of July 30.—Sugar of all kinds, 30 per cent ad valorem.

1861, Act of March 2.—Raw sugar, ¾ cent; refined sugar, 2 cents; refined sugar, when tinctured, colored or adulterated, 4 cents.

1861, Act of August 5.—Sugars not above No. 12 Dutch standard of color, 2 cents; above No. 12 Dutch standard, 2½ cents, refined sugar, 4 cents; refined sugar, when tinctured, colored or adulterated, 6 cents.

1862, Act of July 14.—Sugars not above No. 12 D. S., 2½ cents; No. 12 to No. 15 D. S., 3 cents; above No. 15 and not above No. 20 D. S., 3½ cents; refined sugar and sugar above No. 20 D. S., 4 cents.

1864, Act of June 30.—Sugars not above No. 12 D. S., 3 cents; No. 12 to No. 15 D. S., 3½ cents; No. 15 to No. 20 D. S., 4 cents; refined sugar and sugar above No. 20 D. S., 5 cents.

1870, Act of July 14.—Sugars not above No. 7 D. S., 1¾ cents; No. 7 to No. 10 D. S., 2 cents; No. 10 to No. 13 D. S., 2¼ cents; No. 13 to No. 16 D. S., 2¾ cents; No. 16 to No. 20 D. S., 3¼ cents; refined sugar and sugar above No. 20 D. S., 4 cents.

1876, Reciprocity treaty with Hawaii, Hawaiian sugar admitted to United States free of duty.

1883, Act of March 3 (Morrill Bill).—Sugars not above No. 13 D. S. and testing not above 75 degrees by the polariscope, 1.40 cents, and for each degree above 75 degrees, 0.04 cent additional; sugars above No. 13 and not above No. 16 D. S., 2.75 cents; above No. 16 and not above No. 20 D. S., 3 cents; above No. 20 D. S., 3.50 cents.

1890, Act of October 1 (McKinley Bill).—Sugar below No. 16 D. S., free; above No. 16 D. S., ½ cent; countervailing duty, 1/10 cent. A bounty of 2 cents per pound was granted on sugar of domestic production.

1894, Act of August 27 (Wilson Bill).—Sugar below No. 16 D. S., 40 per cent ad valorem; sugar above No. 16 D. S., 40 per cent ad valorem and ⅛ cent per pound; countervailing duty, 1/10 cent. Bounty on home-produced sugar repealed.

1897, Act of July 24 (Dingley Bill).—Sugar not above No. 16 D. S., and not above 75 degrees by the polariscope, 0.95 per cent, and for each degree above 75 degrees, 0.035 cent additional; refined sugar and sugar above No. 16 D. S., 1.95 cents; countervailing duty, equal to bounty paid in foreign country of origin.

1903, Cuban Reciprocity Treaty effective December 3.—Cuban sugar granted reduction of 20 per cent from full duty rate. Duty on 96-degree Cuban sugar, 1.348 cents a pound.

1909, Act of August 5 (Payne-Aldrich Bill).—Sugar not above No. 16 D. S., and not above 75 degrees by the polariscope, 0.95 cent, and for each degree above 75 degrees, 0.035 cent additional; refined sugar and sugar above No. 16 D. S., 1.90 cents. Duty on Cuban 96-degree, 1.348 cents.

1913, Act of October 3 (Underwood-Simmons Bill).—Duty on all sugar reduced 25 per cent from March 1, 1914, making duty on Cuban 96-degree sugar 1.0048 cents; full duty rate, 96-degree sugar, 1.256 cents; refined sugar, except from Cuba, 1.36 cents. Clause providing that all sugar be placed on free list May 1, 1916, repealed before becoming effective.

1921, Act of May 27 (Emergency Tariff Bill).—Sugar testing not above 75 degrees by the polariscope, 1.16 cents, and for each degree above 75 degrees, 0.04 cent additional. Duty on Cuban 96-degree, 1.60 cents; full duty, 96-degree, 2 cents; duty on refined, except Cuban, 2.16 cents.

1922, Act of September 22 (Fordney-McCumber Bill).—Sugar testing not above 75 degrees by polariscope, 1.24 cents, and for each degree above 75 degrees, 0.046 cent additional. Duty on Cuban 96-degree, 1.7648 cents; full duty, 96-degree, 2.206 cents; duty on refined, except Cuban, 2.39 cents.

1930, Act of June 17 (Hawley-Smoot Bill).—Sugar testing not above 75 degrees by polariscope, 1.7125 cents, and for each additional degree, 0.0375 cent. Duty on Cuban 96-degree, 2 cents; full duty, 96-degree, 2.50 cents; duty on Cuban refined (100 degrees), 2.12 cents; full duty on refined, 2.65 cents.

1934, Executive Proclamation effective June 8.—A proclamation by the President under the discretionary power granted by the Tariff Act of 1930 reduced basic duty rate to 1.284375 cents for sugar testing not above 75 degrees, with 0.028125 cent additional for each degree above 75. Duty on Cuban 96-degree, 1.50 cents; full duty, 1.875 cents. Duty on Cuban refined, 1.59 cents; full duty, 1.9875 cents.

1934, Cuban Reciprocity Treaty effective September 3.—Tariff preference to Cuba increased from 20 to 40 per cent. Duty on Cuban 96-degree sugar, 0.90 cent a pound; duty on Cuban refined, 0.954 cent. Full duty rates unchanged.

Sugar Tariffs in Other Countries

THE period since 1930 has been marked by a decided trend in nearly all countries to strengthen their domestic sugar industries by higher tariff walls. Countries which already imposed import duties on sugar have increased these duties, and a number of countries which formerly levied no duties, or nominal ones, have adopted a protectionist policy. Among countries that have revised their sugar tariffs and adopted higher schedules of duties within this period may be mentioned the United Kingdom and many of the continental European states, India, China and Canada. In addition to the imposition of strongly protective tariffs, a number of important countries have adopted more far-reaching methods of regulation through state monopolies, or the adoption of quota systems for the regulation of imports. Among the outstanding exemplars of the former system are the Soviet Union and Australia, to which Turkey and Latvia have recently been added. The quota system in various forms is employed by many countries of Europe, and in the United States under the Jones-Costigan Act of 1934 and the Sugar Act of 1937.

The accompanying table gives the existing sugar tariff rates of the European countries and a number of the more important countries outside Europe, together with the rates of consumption or excise taxes applicable to imported sugar. Where countries have maximum and minimum tariffs, both rates are given.

EUROPE
Duties Per 100 Kilos

Country	Import Duty		U. S. Equiv. Cents per Lb.	Consumption Tax on Imported Sugar		U. S. Equiv. Cents per Lb.
Belgium:						
Raw	100	Francs	1.54	60	Francs	0.92
Refined	100	Francs	1.54	60	Francs	0.92
Bulgaria:						
Raw	40	gold Leva	2.27	69.50	gold Leva	3.94
Refined	55	gold Leva	3.12	69.50	gold Leva	3.94
Czechoslovakia:						
Raw	338	Crowns	5.34	184	Crowns	2.90
Refined	338	Crowns	5.34	184	Crowns	2.90
Denmark:						
Raw	9-11.50	Crowns	1.15		None[2]	
Refined	15	Crowns	1.50		None	
Esthonia:						
Raw	30	Crowns[4]	3.70		None	
Refined	30	Crowns[4]	3.70		None	
Finland:						
Raw	325	Marks	3.25		None	
Refined	380	Marks	3.80		None	
France:						
Raw	169.90	Francs (paper)[3]	3.44	100.50	Francs (paper)	2.05
Refined	174.30	Francs (paper)	3.53	100.50	Francs (paper)	2.05
Germany:						
Raw	27	Reichsmarks	4.93	21	Reichsmarks	3.83
Refined	32	Reichsmarks	5.84	21	Reichsmarks	3.83
Greece:						
Raw	40	gold Drachmas[4]	2.43		None	
Refined	40	gold Drachmas[4]	2.43		None	
Hungary:						
Raw	38.80	gold Crowns	4.04	50	Pengo	4.49
Refined	38.80	gold Crowns	4.04	50	Pengo	4.49
Italy:						
Raw	110.00	Lire (paper)	2.65	364	Lire (paper)	8.78
Refined	165.00	Lire (paper)	3.94	380	Lire (paper)	9.07
Jugoslavia:						
Raw	20	gold Dinars[4]	2.55	68.18	gold Dinars	7.20
Refined	25-35	gold Dinars[4]	2.91-4.07	68.18	gold Dinars	7.20
Latvia:						
Raw	11	Lats[1,4]	0.97		None	
Refined	20	Lats[4]	1.77		None	
Lithuania:						
Raw	No Duty				None	
Refined	70-80	Litas	5.57-6.14		None	
Netherlands:						
Raw	No Duty			25.20	Florins[5]	4.51
Refined	2.40	Florins	0.60	31.50	Florins	5.60

1) For raw sugar imported for refining purposes only. Other raw sugar is charged with the same rate as refined sugar.

2) Sugar produced from home grown beets is charged only with a consumption tax of 60 francs per 100 kilos.

3) The consumption tax levied on raw sugar imported for refining purposes amounts to 4.65 francs per gold franc per 100 kilos, which is equivalent to 0.27 cents per pound.

4) Duties according to the minimum tariff.

5) Sugar of 98° pol. The taxation rate for sugar between 98° and 99.5° pol. is 31.50 florins per 100 kilos, that over 99.5° pol. 37.80 florins per 100 kilos.

Country	Import Duty		U. S. Equiv. Cents per Lb.	Consumption Tax on Imported Sugar		U. S. Equiv. Cents per Lb.
Norway:						
Raw	33	Crowns	3.71		None	.....
Refined	33	Crowns	3.71		None	.....
Poland:						
Raw	90	Zloty[1])	7.74	125	Zloty	10.60
Refined	105	Zloty[1])	9.03	125	Zloty	10.60
Portugal:						
Raw	4.73	gold Escudos	0.96		Calculated Monthly*	.....
Refined	5.94	gold Escudos	1.20		Calculated Monthly*	.....
Rumania:						
Raw	900	Lei (paper)[1])	3.02	1400	Lei (paper)	4.70
Refined	400-500	Lei (paper)[1])	1.34-1.68	1400	Lei (paper)	4.70
Soviet Union:						
Raw	80%	ad valorem[1])	.....	85-87%	ad valorem	.....
Refined	150%	ad valorem[1])	.....	83-86%	ad valorem	.....
Spain:						
Raw	60	gold Pesetas	8.90	45	Pesetas (paper)	2.96
Refined	60	gold Pesetas	8.90	45	Pesetas (paper)	2.96
Sweden:						
Raw	7	Crowns	0.81		None	.....
Refined	10	Crowns	1.15		None	.....
Switzerland:						
Raw	6	Francs	0.62		None	.....
Refined	19-24	Francs	1.97-2.49		None	.....
Turkey:						
Raw	15	Turkish Pounds+10%	50.7	15.08	Turkish Pounds†	53.4
Refined	15	Turkish Pounds+10%	50.7	15.08	Turkish Pounds†	53.4

*The calculation of the consumption tax is adjusted to the world market parity so that the price of sugar, including duty and all costs, amounts at Lisbon to 15.50 gold escudos per 100 kilos.
†The consumption tax is based exclusively on home-grown sugar.
[1]Rates according to the minimum tariff.

CANADA: Per 100 Pounds

Class	Sugar Polarizing 96-97°	97-98°	Over 98°
134. Refined and all sugar over 16 D.S., not for refining purposes			
General tariff	$1.74	$1.77	$1.80	$1.89
Preferential tariff	.99	1.01	1.03	1.09
135. Sugar imported for refining, and sugar not above 16 D.S.—				
General tariff	$1.28712	$1.32255	$1.35798	$1.47606
Preferential tariff	.28712	.29688	.30664	.35606†

†0.3164 per 100 pounds when imported for refining purposes from Australia, under special trade agreement.

INDIA

The duty on sugar imported into British India, raw and refined, is 7 rupees 4 annas per hundredweight. This is equivalent to 2.34 cents per pound with the rupee worth 37.59 cents. In addition to this duty, there is a consumption tax of 2 rupees (75.18 cents) per hundredweight.

UNITED KINGDOM: Per Cwt.

Sugar Polarizing	General Tariff	Empire Tariff	Certified Colonial	Excise Tax
95 to 96 deg.	8s 1.6d	4s 4.8d	1s 4.8d	3s 3.8d
96 to 97 deg.	8s 4.3d	4s 6.3d	1s 5.3d	3s 4.9d
97 to 98 deg.	8s 7.0d	4s 7.7d	1s 5.8d	3s 6.0d
98 to 99 deg.	11s 8.0d	4s 9.2d	1s 6.3d	3s 7.1d
99 and higher	11s 8.0d	5s 10d	2s 4.7d	4s 7.0d

EIRE (IRISH FREE STATE): Per Cwt.

	General Tariff	Consumption Tax
Refined Sugar	16s 4d	1s 2d

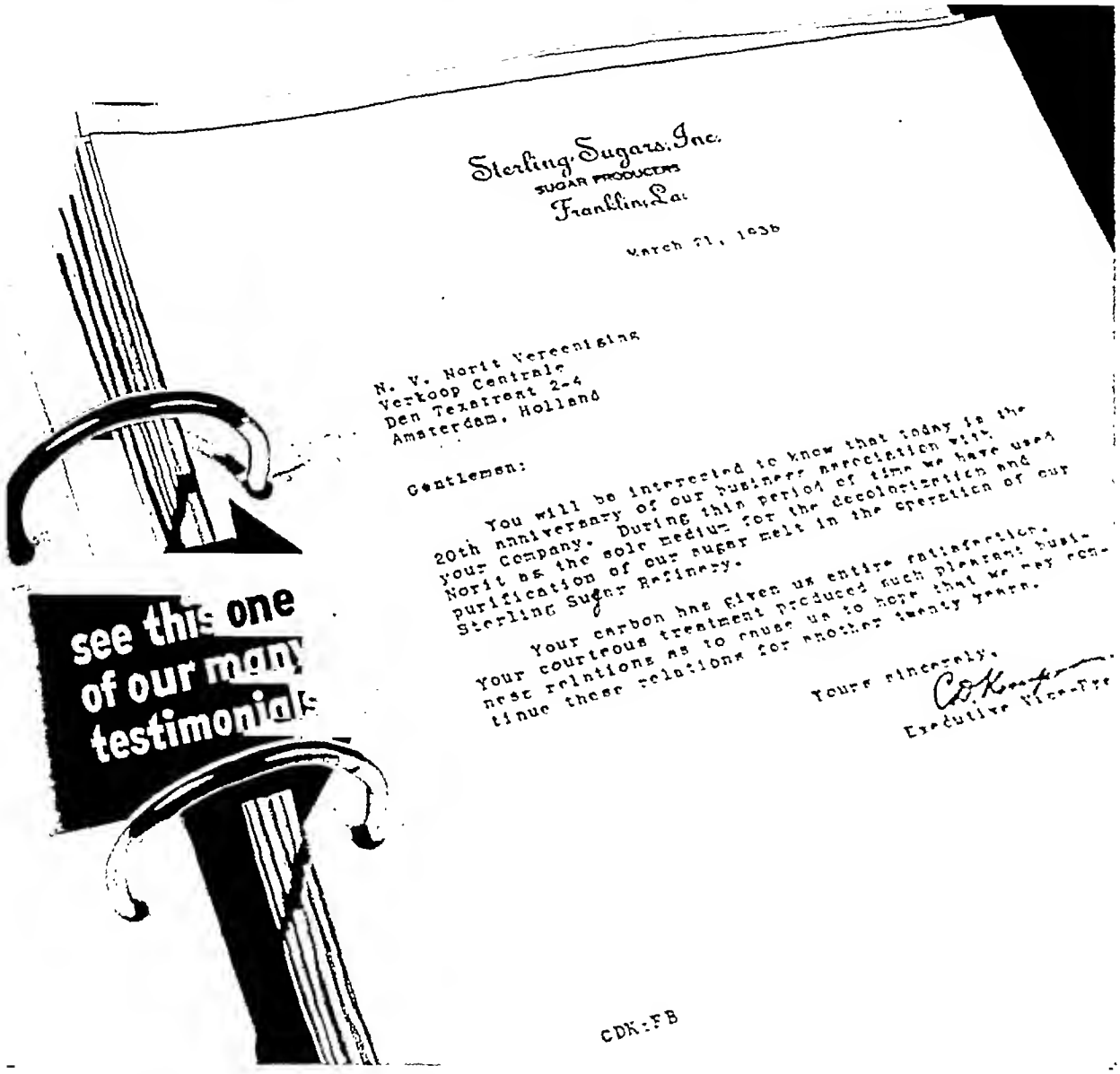
ARGENTINE REPUBLIC

Sugar over 96 degrees.—Import duty 7 gold pesos per 100 kilos, (2.97 cents per pound.)
Sugar under 96 degrees.—Import duty 5 gold pesos per 100 kilos. (2.12 cents per pound.)

CHINA

	New Tariff (Yen per 100 Kilos)	Old Tariff (Yen per 100 Kilos)
A. Refined, with more than 2% invert sugar	4.50	9.00
B. Others—		
Not over 86°	3.50	6.35
86-94°	4.00	6.50-7.60
94-98°	4.50	7.80-8.80
Over 98°	4.50	9.00
C. Cube and Loaf	10.00	20.00
D. Sugar Candy	9.00	15.00

nothing but NORIT... for another twenty years!



N.V. NORIT-VEREENIGING VERKOOP CENTRALE, AMSTERDAM · HOLLAND
AMERICAN NORIT COMPANY, INC. 551 FIFTH AVENUE · NEW-YORK

ANNOUNCING

"THE SUGAR CATALOG" (IN SPANISH)

Write for details

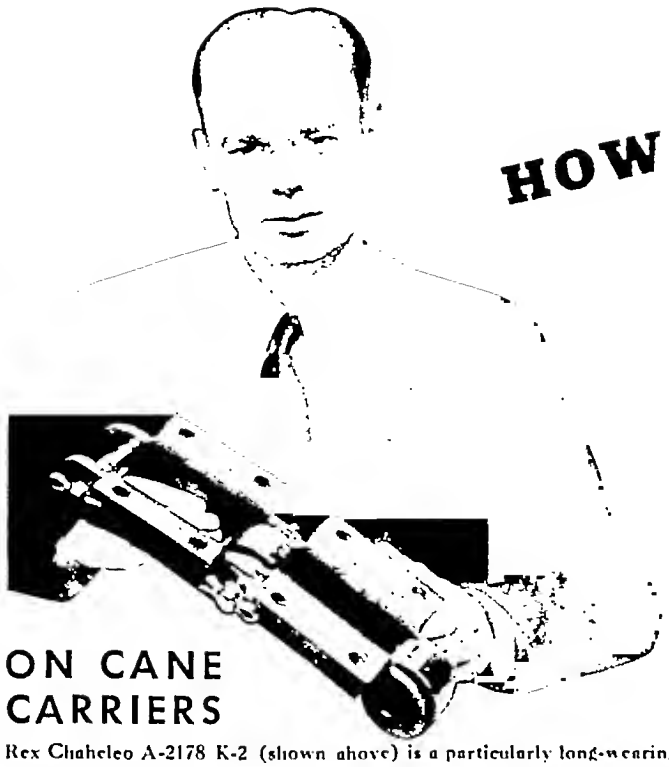
A NEW SERVICE FOR THE SPANISH-READING
SUGAR-PRODUCING COMPANIES OF THE WORLD

"URGENTLY NEEDED"..... SAY FACTORY OWNERS

RUSSELL PALMER, PUBLISHER

95 River Street

Hoboken, N. J.



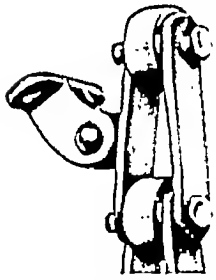
HOW TO HANDLE IT

IF IT IS SUGAR CANE

ON CANE CARRIERS

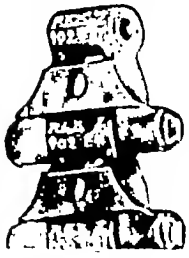
Rex Chaineleo A-2178 K-2 (shown above) is a particularly long-wearing cane carrier chain due to the superior strength, toughness and accuracy of all its highly finished parts. The ground pins, bushings and rollers—combined with the sidebars in the Rex Press Fit Link—maintain the accurate pitch of each link and contribute to the smooth operation and long life of the chain. Alemite-lubricated pins are optional at a slight increase in cost.

ON BAGASSE CONVEYORS



Rex Chaineleo 2184 is another chain that Chain Belt has improved to give longer service in the sugar mill. Made of selected and heat-treated steels, it is stronger and lighter in weight than malleable chain, which means savings in the dead load pulled. The A-42 attachments are welded into the sidebars. And then, Rex Press Fit construction produces a chain that will hold its pitch, shape and sprocket fit on this difficult service.

ON INTERMEDIATE CARRIERS



The superior design of Rex 902 E-41 chain distributes the driving force between the extended barrels . . . assuring longer life. When cast in Rex Z-Metal, it has greater strength, greater hardness and much greater resistance to corrosion than malleable chains. Equip your intermediate carriers with these longer-wearing chains.

IN JUICE STRAINERS

Rex Z-Metal chains are also made in all sizes for juice strainers. They have proved especially valuable in this corrosive service.

ON FLIGHT CONVEYORS

Rex Steel Flights are accurately made from mild copper-bearing or galvanized steel, depending upon the degree of acid corrosion to which they are to be exposed. Their accuracy and the correct design assure the utmost in smooth operation and in wearing value.

THE REX LINE

of Sugar Mill Chain is complete for Cane Carriers, Intermediate Carriers, Bagasse Conveyors, Juice Strainers, Bucket Elevators and all types of Sugar Mill Drives . . . also in Sprockets, Flights, Buckets, Spray Nozzles and accessory equipment.

Send for the catalog, "Rex Sugar Mill Chains," in English, No. 241, or Spanish, No. 275. Either will be sent free.

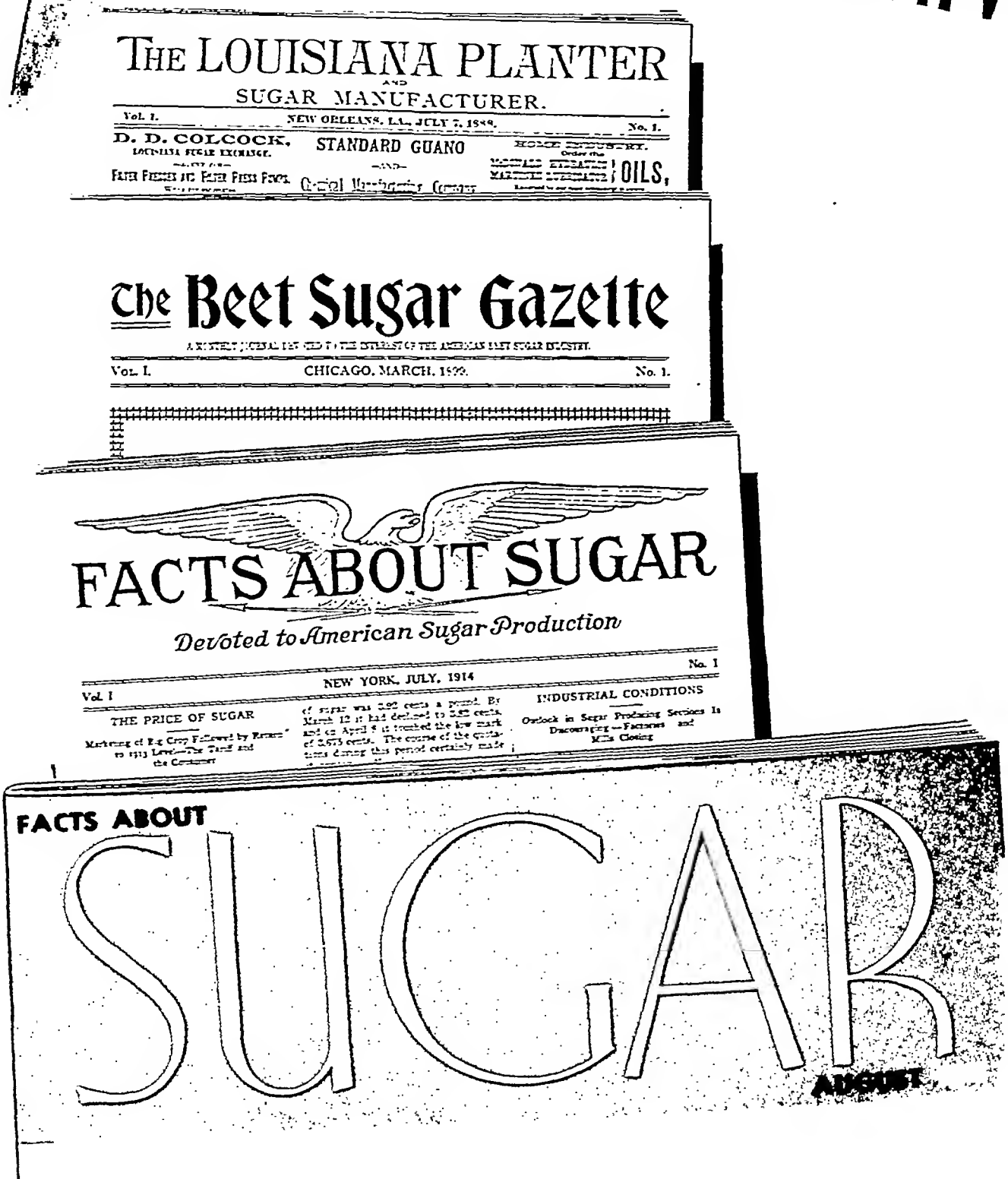
CHAIN BELT COMPANY
1639 West Bruce Street
Milwaukee Wis U. S. A.
Chain Belt Exp. New York N. Y.
Cable Address "Rexchain"

REX

CHAIN BELT COMPANY
of MILWAUKEE

Sugar Mill Chains

50 YEARS OF SERVICE



NORTHERN WORKS AT FIVES FRESNES-ESCAUT AND LILLE

Codes: LIEBER'S LIEBER'S 5 LETTERS BENTLEY'S ABC 5th and 6th Editions Cogef Tugagne

CIE DE FIVES - LILLE

POUR CONSTRUCTIONS MÉCANIQUES & ENTREPRISES

CAPITAL Frs: 75.000.000

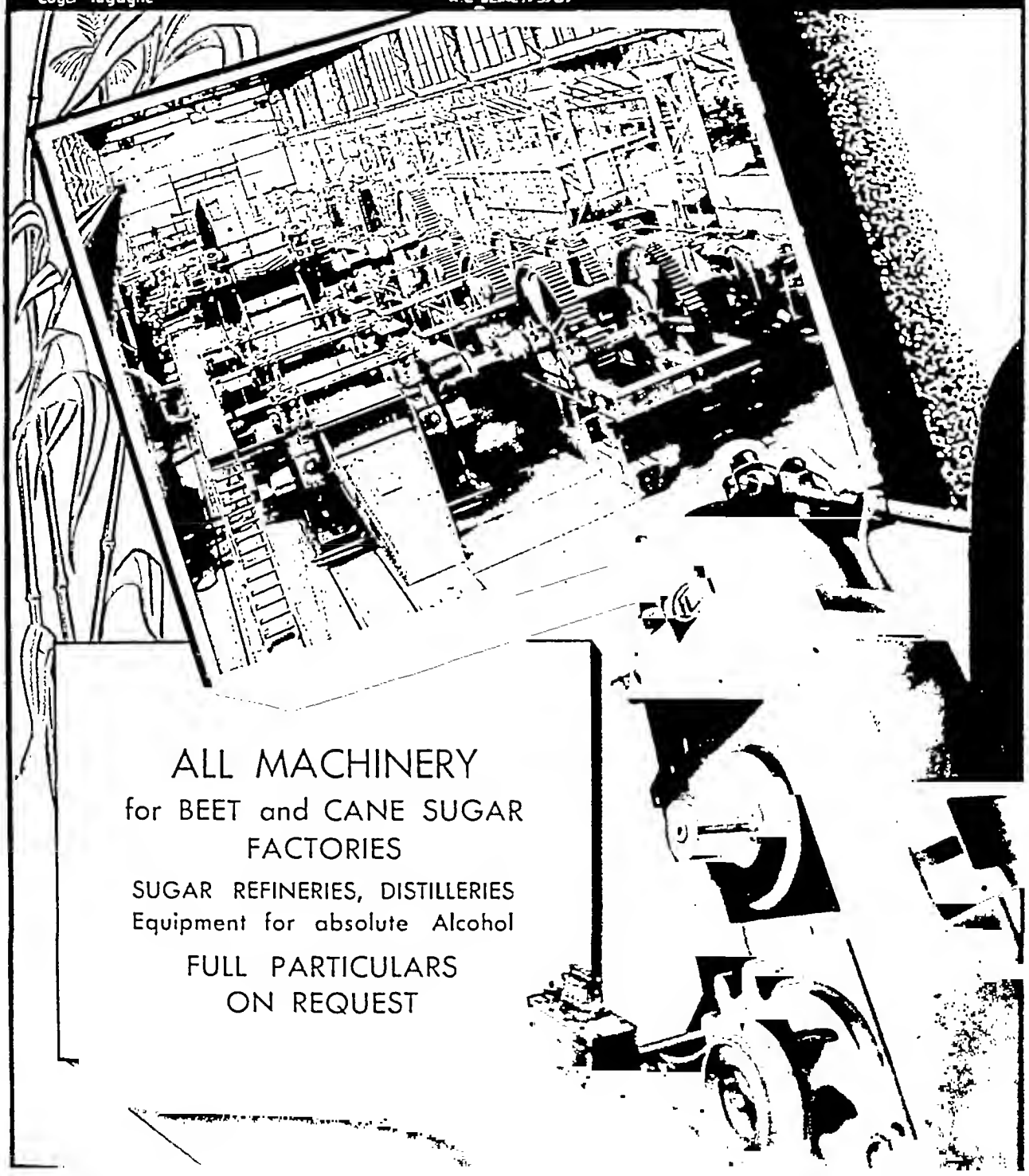
REGISTERED AND HEAD OFFICES

7 rue Montalivet. PARIS (8e)

R.C. SEINE: 79707

MIDLAND WORKS AT GIVORS (RHONE)

CABLE ADDRESS FIVILLE.03.PARIS



ALL MACHINERY

for BEET and CANE SUGAR FACTORIES

SUGAR REFINERIES, DISTILLERIES

Equipment for absolute Alcohol

FULL PARTICULARS ON REQUEST

ADVERT-PARIS

U·C·M·A·S.

Union des Constructeurs Belges de Materiel de Sucrerie

Co-operative Society

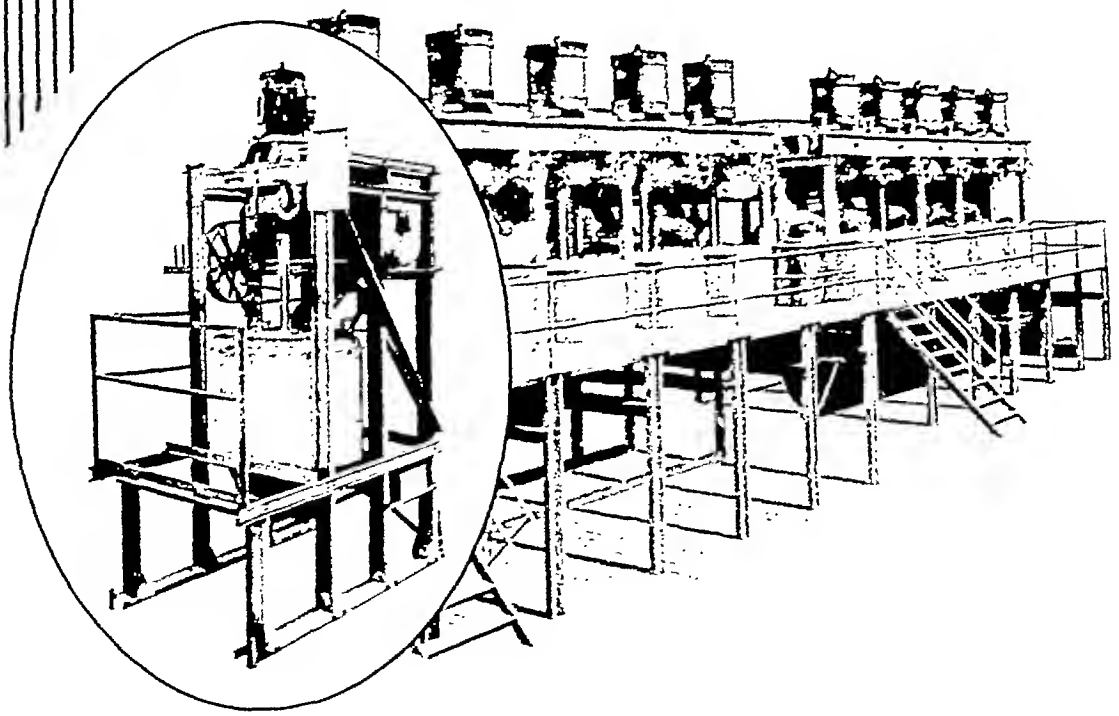
18, Chaussee de Charleroi, Brussels, Belgium

Cable address: U.C.M.A.S.—Belgium

Partners:

Ateliers de Construction Mécanique de Tirlemont, A.C.M.T.
S. A. des Ateliers du Thiriau, La Croyère
S. A. des Ateliers de Construction de Boussu
Ateliers de Constructions Électriques de Charleroi, A.C.E.T.
Ateliers Boël Marlier, Roucourt.

ALL SUGAR MACHINERY

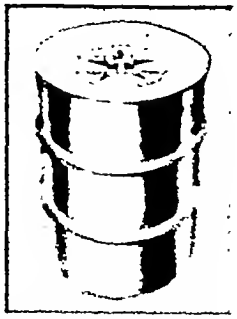


SUGAR MILL GEARS

Less Waste...Less Wear

YOUR sugar mill gears will run longer, operate quieter, transmit loads more smoothly... when their lubrication needs have been met. All over the world, these gears are lubricated with Texaco Crater.

Texaco Crater coats gear teeth in a film that clings, one that resists squeezing out under the heavy pressures, a tough, viscous film that lasts longer. Many plants use Texaco Crater to protect metal parts from rust and corrosion during the idle season.



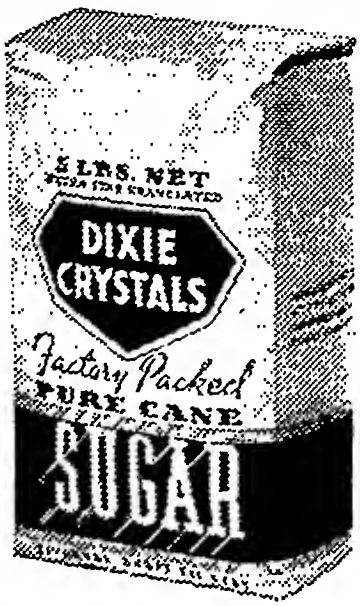
Should the lubricant now used on your gear teeth fail to cling, permitting metallic contact and consequent wear, start using Texaco Crater. You'll have less waste, less wear.

AVAILABLE THROUGHOUT THE WORLD

TEXACO *CRATER*

DIXIE CRYSTALS

Improved Package



OFFERS

CLEANLINESS and SANITATION

Through the adoption of a Sanitary, non-porous paper bag, Dixie Crystals Sugar now reaches the consumer in the same pure condition in which it leaves the Refinery and UNTOUCHED by human hands.

PROTECTION

This modern method of packing sugar in sift-proof, Multi-wall paper bags, with patented "Sealtite" closure, provides complete protection against dust, dirt and other contaminating substances.

ECONOMY

Factory packed, but offered at a cost low enough to insure a Saving to the grocer and a Saving to the consumer.

FULL WEIGHT

Weighed by automatic scales—full weight guaranteed.

AVAILABLE IN FOUR CONSUMER UNITS

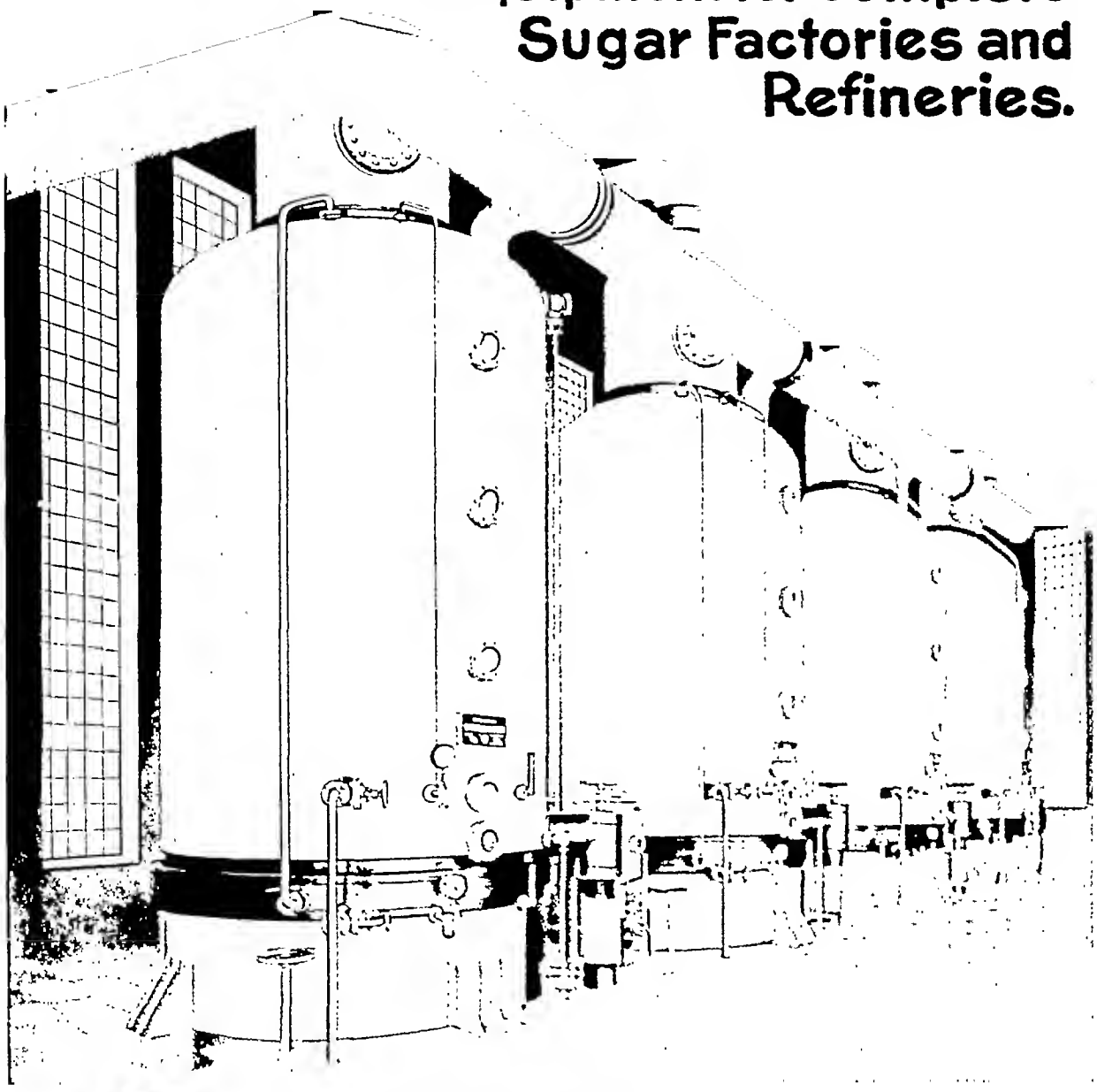
25-LB. 10-LB. 5-LB. AND 2-LB. BAGS.

Savannah Sugar Refining Corporation

SAVANNAH, GEORGIA

FOR THE SUGAR INDUSTRY

Single Apparatuses, Complete Plants, Equipment for complete Sugar Factories and Refineries.

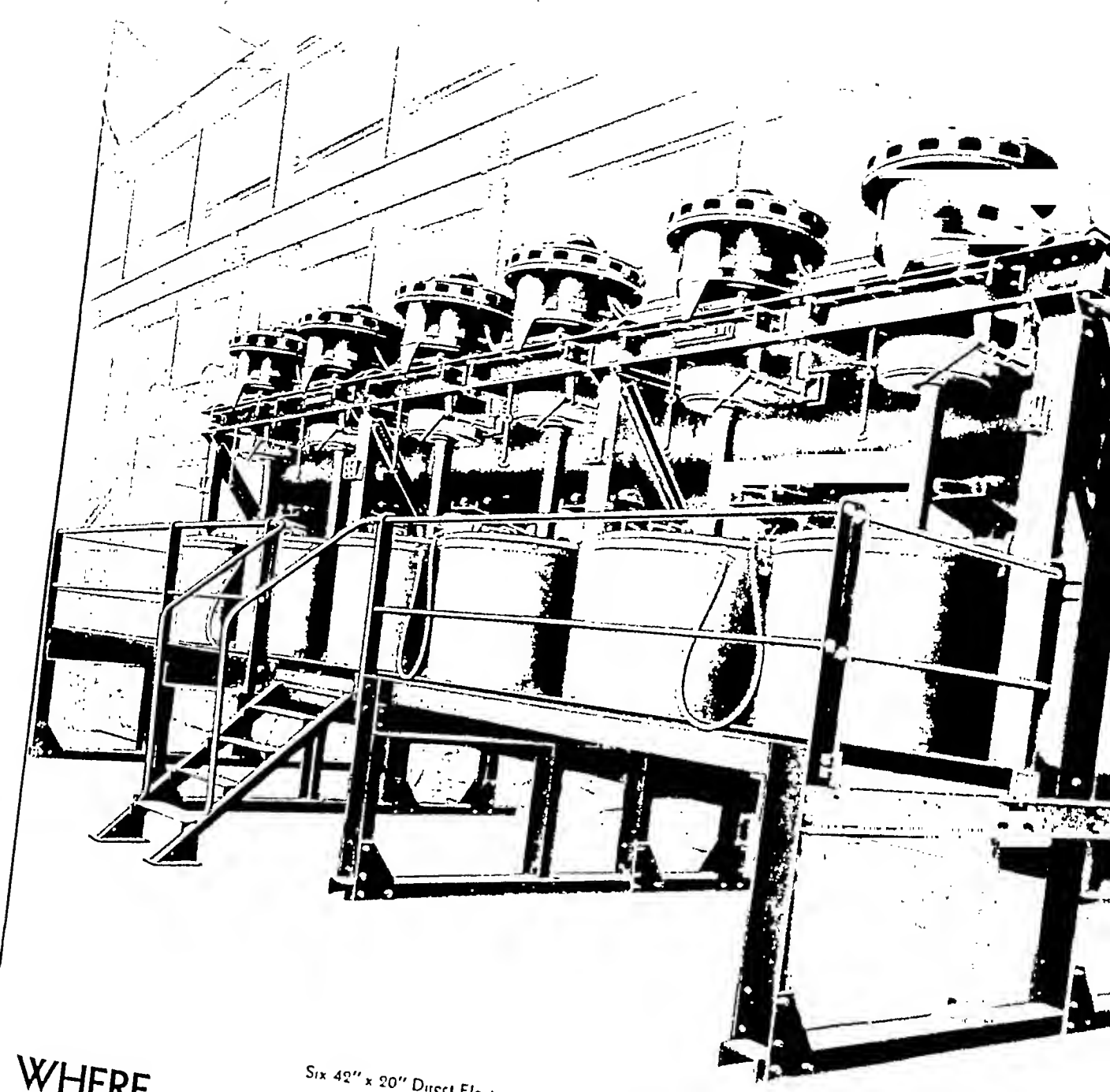


MASCHINENFABRIK

SANGERHAUSEN

A.-G. IN SANGERHAUSEN GERMANY

1037



Six 42" x 20" Direct Electrically-Driven Centrifugals with Mixer, Conveyor, Etc.

Let us Quote for
Electric, Belt or Hydraulic Centrifugals
In Batteries of any Number

WHERE
ABSOLUTE RELIABILITY
IS ESSENTIAL
SPECIFY

1864 to 1938

BROADBENT

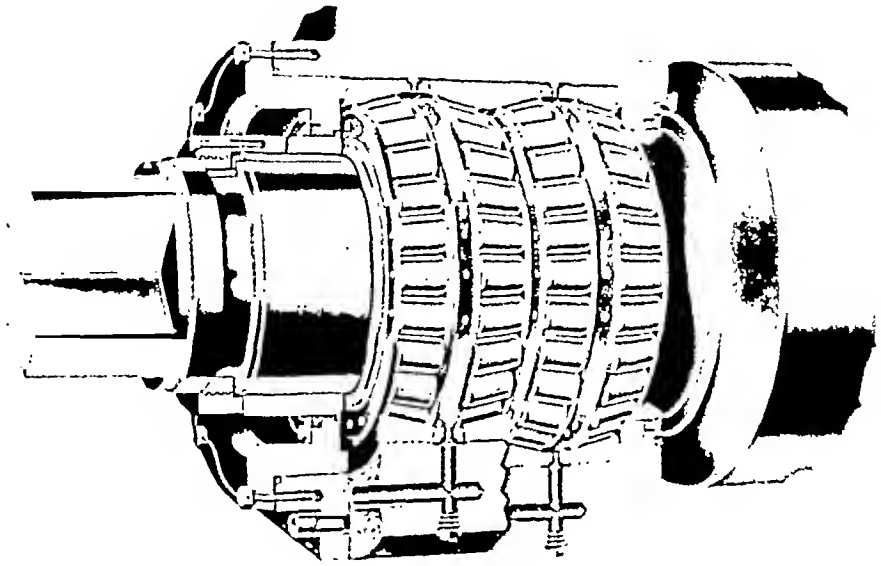
HIGH SPEED CENTRIFUGALS

- SUPERIOR CONSTRUCTION
- RAPID ACCELERATION
- HIGHEST SPEEDS
- COMPETITIVE PRICES
- EARLY DELIVERIES

THOMAS BROADBENT & SONS LIMITED

CABLES
BROADBENT, HUDDERSFIELD

STEEL MILL BEARING ENDURANCE FOR CANE CRUSHING MILLS



TIMKEN Roll Neck Bearings in steel mills have rolled upwards of 2,000,000 tons of steel—in spite of the terrific rolling pressures, shock and thrust loads encountered in this service.

It takes years of continuous operation for one rolling mill to produce that amount of steel. With cane crushers operating only a few weeks each year, however, you can easily imagine the length of active life that could be expected from TIMKEN Bearings on cane crusher rolls. Furthermore, you would enjoy several other important advantages including avoidance of operating interruptions due to roll neck bearing failures; power savings ranging from 35% to 50%; simplified and economized lubrication; and of course greatly reduced maintenance expense.

A Timken Bearing Equipped mill would naturally cost more than a plain bearing mill, but the economies made possible by TIMKEN Bearings would soon pay the difference. Consult the crushing equipment builder or our engineers.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

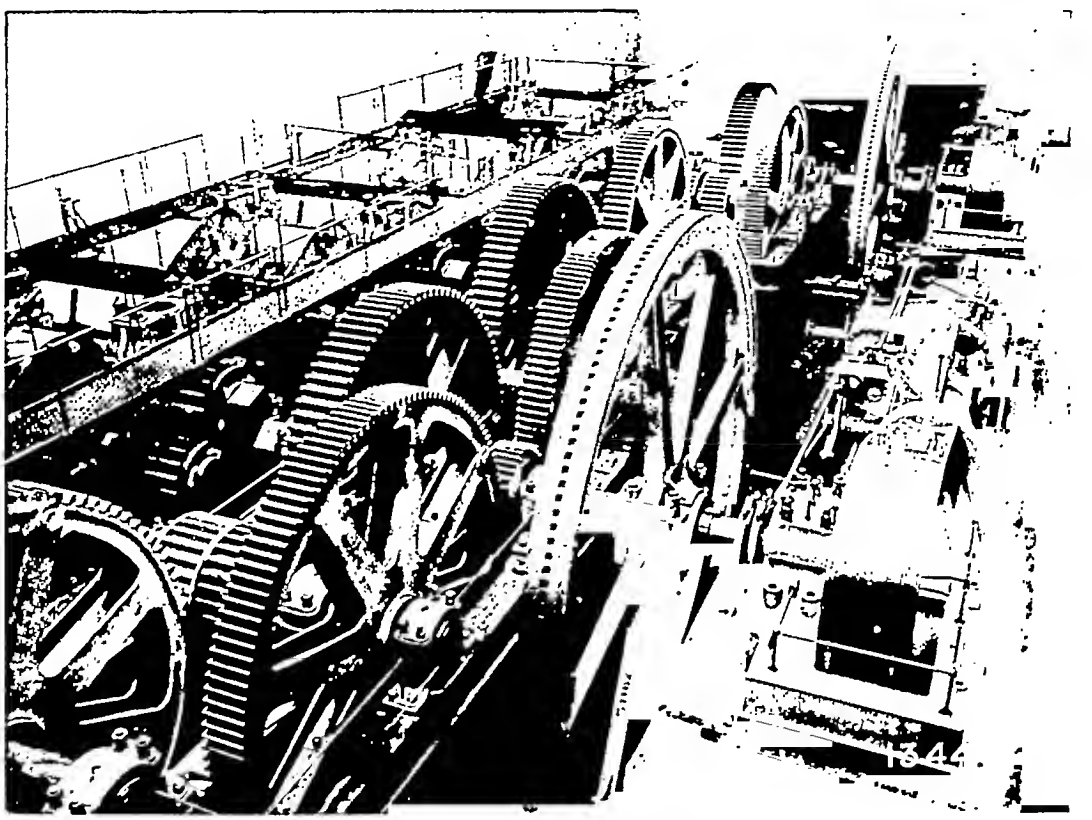
Manufacturers of TIMKEN Tapered Roller Bearings for automobiles motor trucks railroad cars and locomotives and all kinds of industrial machinery; TIMKEN Alloy Steels and Carbon and Alloy Seamless Tubing; TIMKEN Rock Bits; and TIMKEN Fuel Injection Equipment.

TIMKEN

TAPERED ROLLER BEARINGS

SMITH

CANE-SUGAR MACHINERY



— Fifteen Roller Sugar-Cane Milling Plant —

As erected in our Works prior to shipment

COMPLETE SUGAR FACTORIES

ADDITIONS RENEWALS

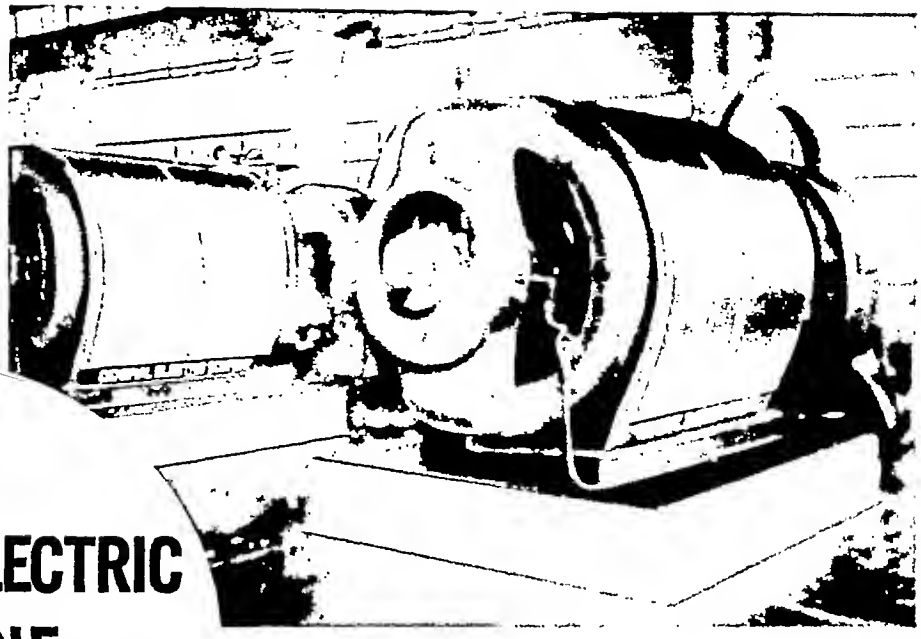
A. & W. SMITH & Co. LTD

ECLINTON ENGINE WORKS

GLASGOW. C.5.

CABLE ADDRESS
ENGINE. GLASCOW

LONDON OFFICE
52. GROSVENOR GDNS S.W.1



Two 1500 Kw General Electric turbine generators which have been giving reliable service in the Central Barahona power plant in Santo Domingo since 1921.

THIS GENERAL ELECTRIC TURBINE IS IN ITS 18TH YEAR

PROOF

THAT QUALITY PAYS

TWO prices are paid for every piece of equipment purchased. First, the capitol investment to put it in service. Second, the maintenance cost to keep it in service.

General Electric believes that maintenance costs are important; therefore, it endeavors to build QUALITY into the original equipment.

It devotes painstaking care to design, to testing of materials, to methods of manufacture and to inspection of work, to the end that the performance may be remembered with satisfaction long after the initial cost is but a record. Quality of product is reflected in low-maintenance costs and continuous dependable service.

Look for perfection of detail—in design, in materials, and in workmanship. They represent the difference between long equipment life and premature depreciation. They are the real reducers of your operating costs. In your business and in ours, we believe it's not "how much does quality cost?"—it's "how much does quality save?"

Products of the General Electric Co., U.S.A. are available throughout the world from representatives of the International General Electric Company, Inc.

GENERAL ELECTRIC

YOUR MILL IS UP-TO-DATE
WHY NOT YOUR FIELD METHODS?

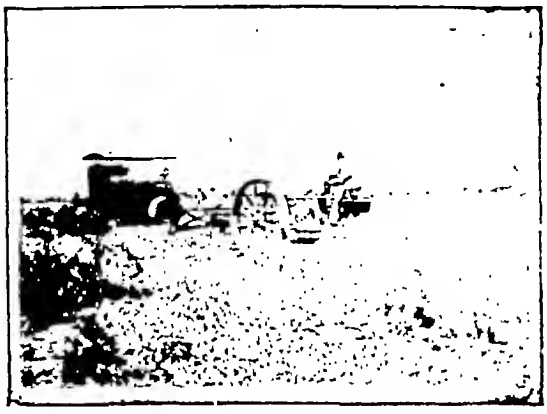
McLAREN

DIESEL OIL CABLE TACKLE

IS THE MOST ECONOMICAL METHOD OF LAND CULTIVATION EVER BROUGHT TO YOUR NOTICE

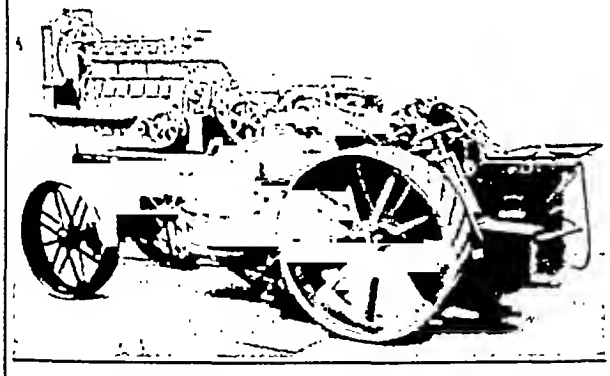
FOR ALL FIELD OPERATIONS

PLOWING, CULTIVATING, SUBSOILING, RIDGING, DRAINING, KNIFING, LAND CLEARING, ETC., ETC.



Cultivating or Subsoiling with McLaren's Diesel Oil Engine Tackle

IF YOU HAVE A STEAM PLOWING SET
CONVERT IT TO
DIESEL



Cable Plowing Engine Converted to Diesel Drive by the McLaren Patent System

MUCH LOWER WORKING COSTS
GREATLY INCREASED ACREAGE
NO CARTING OF FUEL OR WATER
FUEL TANKS CARRY OVER ONE WEEK'S SUPPLY

Also Makers of
HIGH SPEED DIESEL OIL ENGINES
16 to 340 B. H. P.
For Every Stationary and Marine Purpose

J. & H. McLaren, LTD.

Cables "McLaren Leeds" **LEEDS** England All Codes Used

LINK-BELT COMPANY

[illegible]

Export Sales Office: [illegible]

Plants at

Chicago Indianapolis Philadelphia Atlanta San Francisco [illegible]

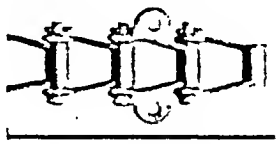
Offices in Principal Cities

Link-Belt Factory Equipment [illegible]

Power Transmission Equipment [illegible]

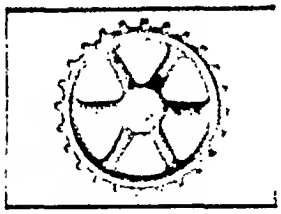
Chains and Attachments

Promal, Malleable and Steel Chains for conveying [illegible] and conveyors. Also a complete line of [illegible]



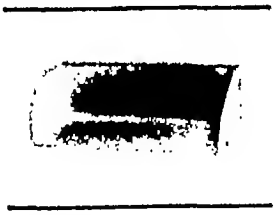
Sprocket Wheels

Link-Belt Specialty of gear iron or Flint-Rim metal. Twenty-five thousand always in stock



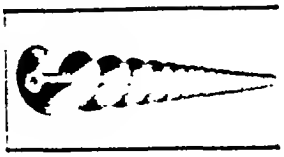
Buckets

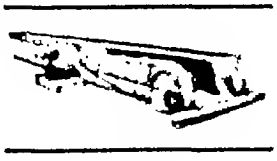
[illegible]



Conveyors and Carriers

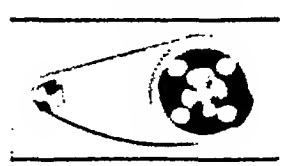
Cane, bagasse [illegible] and carriers [illegible] to plantation screw [illegible] and steel types

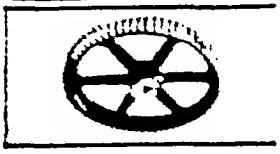




Positive Power Transmission

Silent Chain Drives [illegible] Worm Gear and Sprocket Helical Gear [illegible] Mitre Gears [illegible] Gears, Cut [illegible]





COMPLETE SUGAR FACTORIES & REFINERIES

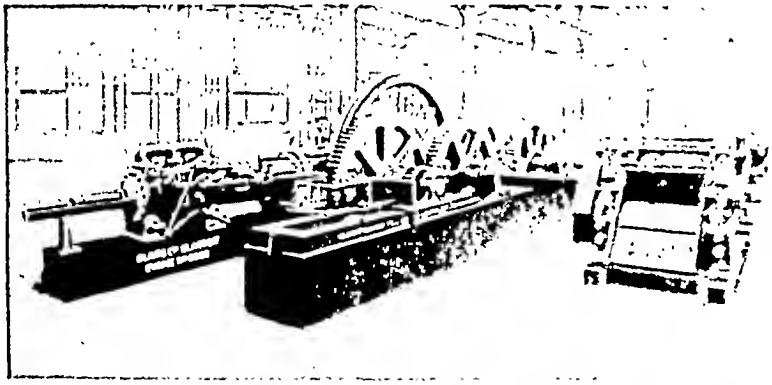
BLAIRS

SUGAR MACHINERY OF

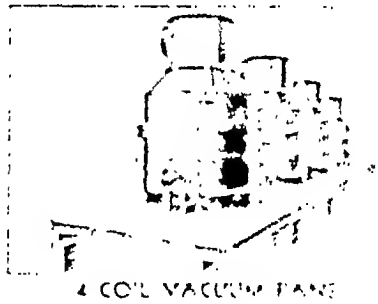
COMPLETE DISTILLING & ABSOLUTE ALCOHOL PLANTS

Reliability • Quality • Efficiency

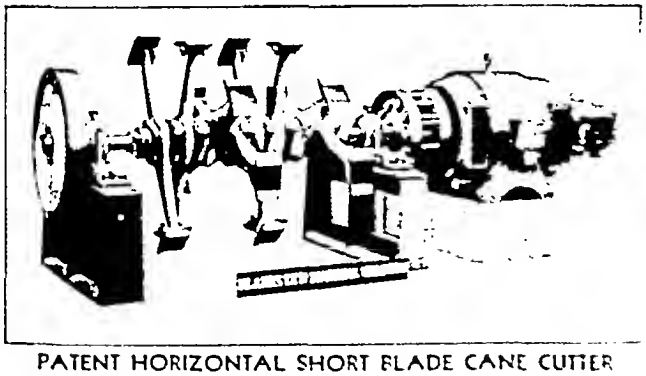
1838 The Results of 100 Years' Experience **1938**



26" x 54" MILLING PLANT ARRANGED FOR FUTURE EXTENSION



4 COIL VACUUM PAN



PATENT HORIZONTAL SHORT BLADE CANE CUTTER

AGENTS IN ALL SUGAR PRODUCING COUNTRIES

BLAIRS LIMITED

GLASGOW ENGINEERING WORKS

1838

INCORPORATING
Blair Campbell & McLean, Ltd.
A. & P.W. McOnie

GLASGOW, S.W.1

Directory of Equipment Manufacturers

AGRICULTURAL MACHINERY

Caterpillar Tractor Company, Peoria, Ill.
International Harvester Company of America, Inc., Chicago, Ill.
Killefer Manufacturing Company, Los Angeles, Calif.
J. & H. McLaren, Ltd., (see page 167)
Oliver Farm Equipment Company, Chicago, Ill.
Owensboro Ditcher & Grader Company, Owensboro, Ky.
Ransomes, Sims & Jefferies, Ltd., Ipswich, England

ALCOHOL PLANTS

Acme Coppersmithing & Machine Company, Oreland, Pa.
Frank L. Allen, Inc., (see page 170)
Ansonia Copper & Iron Works, Inc., Cincinnati, Ohio
Baeuerle & Morris, Inc., Philadelphia, Pa.
Blairs Ltd., (see page 171)
J. P. Devine Manufacturing Co., Inc., Mt. Vernon, Ill.
Cie de Fives-Lille, (see page 155)
Geo. Fletcher & Company Ltd., Derby, England
The Lummus Company, (see page 170)
Philadelphia Coppersmithing Co., Philadelphia, Pa.
Skoda Works, Ltd., (see page 160)
Geo. L. Squier Manufacturing Co., (see page 13)
Maschinenfabrik Buckau R. Wolf A.-G., (see page 179)

BAGASSE CARRIERS

Blairs Ltd., (see page 171)
Chain Belt Company, (see page 153)
Fawcett, Preston & Co. Ltd., Liverpool, England
Cie de Fives-Lille, (see page 155)
Fulton Iron Works Company, (see page 4)
Goslin-Birmingham Manufacturing Company, Inc., Birmingham, Ala.
Jeffrey Manufacturing Company, (see page 12)
Link-Belt Company, (see page 167)
Mirrlees Watson Company Ltd., (see page 162)
Geo. L. Squier Manufacturing Co., (see page 13)
Duncan Stewart & Company, Ltd., (see page 168)

BAGASSE FURNACES

Babcock & Wilcox Company, New York, N. Y.
Bigelow-Liptak Corporation, Detroit, Mich.
Blairs Ltd., (see page 171)
M. H. Detrick Company, Chicago, Ill.
Edge Moor Iron Works, Edge Moor, Del.
M. A. Hofft Company, Indianapolis, Ind.
Duncan Stewart Co., Ltd., (see page 168)
John Thompson Water Tube Boilers Ltd., Wolverhampton, England

BEARINGS (Roller)

SKF Industries, Inc., Philadelphia, Pa.
Timken Roller Bearing Company, (see page 163)

BEET SUGAR FACTORIES

Blairs Ltd., (see page 171)
Dyer Company, Cleveland, Ohio
Fawcett, Preston & Co., Ltd., Liverpool, England
Cie de Fives-Lille, (see page 155)
Geo. Fletcher & Company Ltd., Derby, England
Fulton Iron Works Company, (see page 4)
Hallesche Maschinenfabrik und Eisengiesserei, (see page 181)
Kilby Manufacturing Company, Cleveland, Ohio
Krupp Grusonwerk, Magdeburg, Germany
Mirrlees Watson Company, Ltd., (see page 162)
Maschinenfabrik Sangerhausen A-G, (see page 159)
Geo. L. Squier Manufacturing Co., (see page 13)
Duncan Stewart & Company, Ltd., (see page 168)
U. C. M. A. S., (see page 156)
Maschinenfabrik Buckau R. Wolf A.-G., (see page 179)

BEET SEED

Amtorg Trading Corp., New York, N. Y.
Marshall Dill, San Francisco, Calif.
Hardy Seed Company, San Francisco, Calif.
I. Marshall & Company, Inc., New York, N. Y.
J. B. Morris Brokerage Company, Denver, Colo.
National Seed Company, Inc., Denver, Colo.

BOILERS

Frank L. Allen, Inc., (see page 170)
Babcock & Wilcox Company, New York, N. Y.
Combustion Engineering Co., Inc., New York, N. Y.
Edge Moor Iron Works, Edge Moor, Del.
Erie City Iron Works, Erie, Pa.
Foster Wheeler Corporation, New York, N. Y.
E. Keeler Company, Williamsport, Pa.
Petree & Dorr Engineers, Inc., (see pages 2-3)
John Thompson Water Tube Boilers Ltd., Wolverhampton, England
Henry Vogt Machine Company, Louisville, Ky.

BOILER TUBES

E. F. Keating Company, New York, N. Y.
Timken Steel & Tube Company, Canton, Ohio

BOOKS—Technical

See pages 6-8

BROKERS

Daub & Carr Company, New York, N. Y.
W. A. Edgar & Sons, Detroit, Mich.
Garcia Sugars Corporation, New York, N. Y.
Geo. E. Keiser & Company, New York, N. Y.
Lamborn & Company Inc., New York, N. Y.
Meinrath Brokerage Company, Chicago, Ill.
L. W. Minford & Company, Inc., New York, N. Y.

CANE CARRIERS

Blairs Ltd., (see page 171)
Chain Belt Company, (see page 153)
Farrel-Birmingham Company, Inc., (see page 10)
Fawcett, Preston & Co., Ltd., Liverpool, England
Cie de Fives-Lille, (see page 155)
Fulton Iron Works Company, (see page 4)
Goslin-Birmingham Manufacturing Company, Inc., Birmingham, Ala.
Jeffrey Manufacturing Company, (see page 12)
Link-Belt Company, (see page 167)
Mirrlees Watson Company Ltd., (see page 162)
Geo. L. Squier Manufacturing Co., (see page 13)
Duncan Stewart & Company, Ltd., (see page 168)

CANE CARS

American Car & Foundry Company, New York, N. Y.
Athey Truss Wheel Company, Chicago, Ill.
Gregg Company Ltd., Hackensack, N. J.
Koppel Industrial Car & Equipment Co., Koppel, Pa.
La Plant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa
Magor Car Corporation, New York, N. Y.
Trackson Company, Milwaukee, Wis.

CANE ELEVATORS

Farrel-Birmingham Co., Inc., (see page 10)

CANE KNIVES AND LEVELERS

Farrel-Birmingham & Co., Inc., (see page 10)

AMAZING RESULTS with the ★SEIP CLARIFIER

THE Seip is the most modern clarifier made, one that every alert sugar mill should install. It means

★ CLEARER JUICE

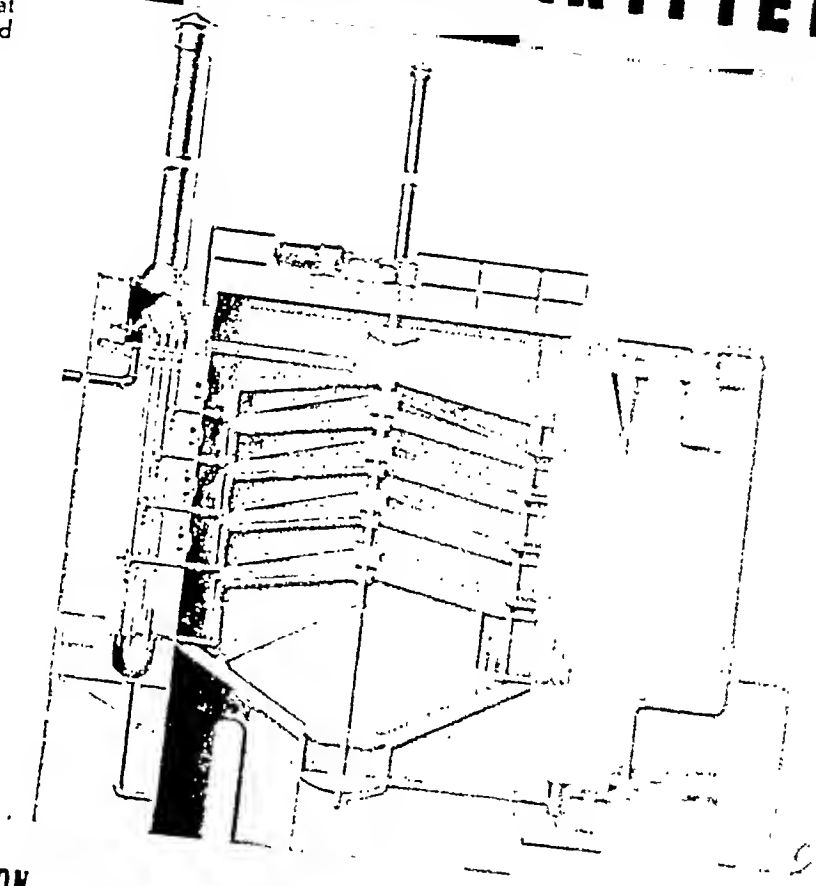
★ MAXIMUM MUD CONCENTRATION

★ GREATER CAPACITY

★ MORE and BETTER SUGAR

The Seip will handle a greater amount of raw juice in a shorter time and produce a clearer, cleaner liquid.

In old-style settlers, liquid enters through a center intake, but in the Seip the intake pipes are located around the tank's periphery, thus providing an intake area more than ten times as large, which means slower flow of liquid and practically no agitation to liquid.



UPWARD FILTRATION

The Seip consists of two, three or as many as seven strongly supported, inverted trays. Each tray forms its own clarifying chamber, the top of the tray below being the bottom of the chamber. A sludge bed accumulates on this bottom, through which liquid entering the chamber is filtered upward—at least 14 times as effective as downward filtering.

Slow moving scraper arms regulate the depth of the sludge filter bed. Draw-off pipes are located inside of each chamber at the greatest distance from the intake channel, thus providing longer settling time

Invented by John [illegible] Seip [illegible] the sugar industry [illegible]

The Seip Clarifier [illegible] beet or cane sugar. [illegible] leak-proof welded steel [illegible] can be installed [illegible] greatly improve [illegible]

Manufactured by the Graver [illegible] three-quarters of a century [illegible] manufacture of [illegible] tanks, [illegible] heating equipment [illegible] etc.

Inquiries are invited from all sugar mills [illegible] interested in improving their clarifying [illegible]

GRAVER TANK & MFG. CO., INC.

75 YEARS OF DEPENDABLE SERVICE

EAST CHICAGO, IND.

CABLE ADDRESS—GRATANK

[illegible]EW YORK, N. Y.

CATASAUQUA, PA.

CANE SUGAR FACTORIES

Blairs Ltd., (see page 171)
Dyer Company, Cleveland, Ohio
Farrel-Birmingham Company, Inc., (see page 10)
Fawcett, Preston & Co., Ltd., Liverpool, England
Cie de Fives-Lille, (see page 155)
Geo. Fletcher & Company Ltd., Derby, England
Fulton Iron Works Company, (see page 4)
Goslin-Birmingham Manufacturing Company, Inc., Birmingham, Ala.
Hallesche Maschinenfabrik und Eisengiesserei, (see page 181)
Krupp Grusonwerk, Magdeburg, Germany
Mirrlees Watson Company Ltd., (see page 162)
Maschinenfabrik Sangerhausen A.-G., (see page 159)
Skoda Works, Ltd., (see page 160)
A. & W. Smith & Company Ltd., (see page 164)
Geo. L. Squier Manufacturing Co., (see page 13)
Duncan Stewart & Company, Ltd. (see page 168)
U. C. M. A. S., (see page 156)
Maschinenfabrik Buckau R. Wolf A.-G., (see page 179)

CANE LOADERS

Bucyrus-Erie Company, Milwaukee, Wis.
Harnischfeger Corporation, Milwaukee, Wis.

CENTRIFUGALS AND ACCESSORIES

Frank L. Allen, Inc., (see page 170)
American Tool & Machine Co., Inc., (see page 7)
Thomas Broadbent & Sons Ltd., (see page 161)
Consolidated Products Co., New York
Cresson-Morris Company (Rigler Engrg. Co.), (see page 168)
Cie de Fives-Lille, (see page 155)
Goslin-Birmingham Manufacturing Company, Inc., Birmingham, Ala.
S. S. Hepworth Company, Long Island City, N. Y.
Kelvin Engineering Co., Inc., New York, N. Y.
Mirrlees Watson Company Ltd., (see page 162)
Pott, Cassels & Williamson, Motherwell, Scotland
Geo. L. Squier Manufacturing Co., (see page 13)
Watson, Laidlaw & Company, Ltd., (see page 166)
Western States Machine Company, (see page 9)

CENTRIFUGAL SCREENS

Harrington & King Perforating Co., Chicago, Ill.
Chas. Mundt & Sons, Jersey City, N. J.
Western States Machine Company, (see page 9)

CHAINS

Frank L. Allen, Inc., (see page 170)
Chain Belt Company, (see page 153)
Jeffrey Manufacturing Company, (see page 12)
Link-Belt Company, (see page 167)
A. & W. Smith & Company Ltd., (see page 164)

CLARIFIERS

Frank L. Allen, Inc., (see page 168)
Graver Tank & Mfg. Co., (see page 173)
Petree & Dorr Engineers, Inc., (see pages 2-3)

COMPOUND CLARIFICATION

Petree & Dorr Engineers, Inc., (see pages 2-3)

CONDENSERS

Frank L. Allen, Inc., (see page 170)
Baeuerle & Morris, Inc., Philadelphia, Pa.
Petree & Dorr Engineers, Inc., (see pages 2-3)
Duncan Stewart & Company Ltd., (see page 168)

CONDENSER TUBING

American Brass Company, Waterbury, Conn.
Revere Copper and Brass, Inc., New York, N. Y.
The Yorkshire Copper Works, Ltd., (see Inside Back Cover)

CONVEYORS

American Tool & Machine Co., Inc., (see page 7)
Blairs Ltd., (see page 171)
Chain Belt Company, (see page 153)
Cie de Fives-Lille, (see page 155)
Fulton Iron Works Company, (see page 4)
S. S. Hepworth Company, Long Island City, N. Y.
Jeffrey Manufacturing Company, (see page 12)
Link-Belt Company, (see page 167)
Mirrlees Watson Company Ltd., (see page 162)
Pott, Cassels & Williamson, Motherwell, Scotland

CRANES

Bucyrus-Erie Company, Milwaukee, Wis.
Harnischfeger Corporation, Milwaukee, Wis.
Link-Belt Company, (see page 167)
Swenson Evaporator Co., (see page 184)

CRUSHERS—Single, Double and Multiple

Blairs Ltd., (see page 171)
Farrel-Birmingham Company, Inc., (see page 10)
Fawcett, Preston & Co., Ltd., Liverpool, England
Cie de Fives-Lille, (see page 155)
Geo. Fletcher & Company Ltd., Derby, England
Fulton Iron Works Company, (see page 4)
Krupp Grusonwerk, Magdeburg, Germany
Mirrlees Watson Company Ltd., (see page 162)
Skoda Works, Ltd., (see page 160)
A. & W. Smith & Company Ltd., (see page 164)
Geo. L. Squier Manufacturing Co., (see page 13)
Duncan Stewart & Company, Ltd., (see page 168)
U. C. M. A. S., (see page 156)

CRYSTALLIZERS

Frank L. Allen, Inc., (see page 170)
Blairs Ltd., (see page 171)
Combustion Engineering Co., Inc., New York, N. Y.
Consolidated Products Co., New York
Dyer Company, Cleveland, Ohio
Goslin-Birmingham Manufacturing Company, Inc., Birmingham, Ala.
Petree & Dorr Engineers, Inc., (see pages 2-3)
A. & W. Smith & Company Ltd., (see page 164)
Geo. L. Squier Manufacturing Co., (see page 13)
Duncan Stewart & Company, Ltd., (see page 168)
Swenson Evaporator Co., (see page 184)
U. C. M. A. S., (see page 156)
Watson, Laidlaw & Company, Ltd., (see page 166)
Werkspoor, Amsterdam, Holland

DECOLORIZING CARBONS

American Norit Company, (see page 151)
Petree & Dorr Engineers, Inc., (see pages 2-3)
Suchar Corporation, New York, N. Y.
Sucro-Blanc, Inc., (see page 5)

DIESEL ENGINES

Caterpillar Tractor Company, Peoria, Ill.
Fulton Iron Works Company, (see page 4)
McIntosh & Seymour Corporation, Auburn, N. Y.
J. & H. McLaren, Ltd., (see page 167)
Worthington Pump & Machinery Corporation, Harrison, N. J.

DRAFT FANS

B. F. Sturtevant Company, Inc., Hyde Park, Boston, Mass.
Geo. L. Squier Manufacturing Co., (see page 13)

...ING SUGAR OR 25 YEARS

...this largest and purest source of quality filter aids

A PRACTICALLY unlimited supply of raw material . . . carefully controlled manufacturing processes . . . the most completely equipped research laboratories . . . these are the reasons why J-M Celite Filter Aids have been standard throughout the sugar industry for more than 25 years.

Today Hyflo Super-Cel, Standard Super-Cel, Filter-Cel and the other J-M Celite Filter Aids are being op-

Johns-Manville CELITE FILTER AIDS

FILTER-CEL...STANDARD SUPER-CEL...CELITE NO. 512...HYFLO SUPER-CEL...CELITE NO. 503...CELITE NO. 512

give maximum flow rates with required clarity on every filtration service

DRYERS

Blairs Ltd., (see page 171)
Hersey Manufacturing Company, (see page 169)
A. & W. Smith & Company Ltd., (see page 164)
Geo. L. Squier Manufacturing Co., (see page 13)

ELECTRICAL EQUIPMENT

Allis-Chalmers Manufacturing Co., Milwaukee, Wis.
Crocker-Wheeler Electric Manufacturing Company, Ampere, N. J.
International General Electric Company, Inc., (see page 165)
Westinghouse Electric International Company, New York, N. Y.

EVAPORATORS

Acme Coppersmithing & Machine Company, Oreland, Pa.
H. W. Aitken Co., Ltd., Paisley, Scotland
Frank L. Allen, Inc., (see page 170)
Baeuerle & Morris, Inc., Philadelphia, Pa.
Blairs, Ltd., (see page 171)
Consolidated Products Co., New York
Fawcett, Preston & Co., Ltd., Liverpool, England
Cie de Fives-Lille, (see page 155)
Geo. Fletcher & Company Ltd., Derby, England
Fulton Iron Works Company, (see page 4)
Goslin-Birmingham Manufacturing Company, Inc., Birmingham, Ala.
Kelvin Engineering Co., Inc., New York, N. Y.
Kilby Manufacturing Company, Cleveland, Ohio
Mirrlees Watson Company Ltd., (see page 162)
Joseph Oat & Sons, Philadelphia, Pa.
Philadelphia Coppersmithing Co., Philadelphia, Pa.
Maschinenfabrik Sangerhausen A.-G., (see page 159)
A. & W. Smith & Company, Ltd., (see page 164)
Geo. L. Squier Manufacturing Co., (see page 13)
Duncan Stewart & Company Ltd., (see page 168)
Struthers-Wells Company, Warren, Pa.
Swenson Evaporator Co., (see page 184)
U. C. M. A. S., (see page 156)
United States Pipe & Foundry Co., Burlington, N. J.

EVAPORATOR TUBING

American Brass Company, Waterbury, Conn.
Revere Copper and Brass, Inc., New York, N. Y.
The Yorkshire Copper Works, (see Inside Back Cover)

FILTER-AIDS

Dicalite Company, (see page 14)
Johns-Manville Corporation, (see page 175)
Petree & Dorr Engineers, Inc., (see pages 2-3)

FILTER CLOTH

Wm. E. Hooper & Sons Company, Philadelphia, Pa.
Oliver United Filters, Inc., (see Inside Front Cover)
Wellington Sears Company, (see page 177)

FILTERS

Frank L. Allen, Inc., (see page 170)
Blairs Ltd., (see page 171)
Consolidated Products Co., New York
Fawcett, Preston & Co., Ltd., Liverpool, England
Cie de Fives-Lille, (see page 155)
Goslin-Birmingham Manufacturing Company, Inc., Birmingham, Ala.
Kilby Manufacturing Company, Cleveland, Ohio
Mirrlees Watson Company Ltd., (see page 162)
Oliver United Filters, Inc., (see Inside Front Cover)
T. Shriver & Company, Harrison, N. J.
A. & W. Smith & Company Ltd., (see page 164)
Swenson Evaporator Co., (see page 184)
U. C. M. A. S., (see page 156)

FOUNDRY AND IRON WORKS

Farrel-Birmingham & Co., Inc., (see page 10)

GEARS

Falk Corporation, Milwaukee, Wis.
Farrel-Birmingham Company, Inc., (see page 10)
Fulton Iron Works Company, (see page 4)
Link-Belt Company, (see page 167)
B. F. Sturtevant Company, Inc., Hyde Park, Boston, Mass.

GRANULATORS

Frank L. Allen, Inc., (see page 170)
Consolidated Products Co., New York
Hersey Manufacturing Company, (see page 169)
Geo. L. Squier Manufacturing Co., (see page 13)

HEATERS AND PREHEATERS

Frank L. Allen, Inc., (see page 170)
Baeuerle & Morris, Inc., Philadelphia, Pa.
Blairs Ltd., (see page 171)
Combustion Engineering Co., Inc., New York, N. Y.
Fawcett, Preston & Co., Ltd., Liverpool, England
Cie de Fives-Lille, (see page 155)
Goslin-Birmingham Manufacturing Company, Inc., Birmingham, Ala.
Kelvin Engineering Co., Inc., New York, N. Y.
Kilby Manufacturing Company, Cleveland, Ohio
Mirrlees Watson Company, Ltd., (see page 162)
A. & W. Smith & Company Ltd., (see page 164)
Geo. L. Squier Manufacturing Co., (see page 13)
Duncan Stewart & Company, Ltd., (see page 168)
Swenson Evaporator Co., (see page 184)
U. C. M. A. S., (see page 156)

HOSE

United States Rubber Export Co., Ltd., (see page 11)

HYDRAULIC ACCUMULATORS

Blairs Ltd., (see page 171)
Farrel-Birmingham Company, Inc., (see page 10)
Fulton Iron Works Company, (see page 4)
Duncan Stewart & Company, Ltd., (see page 168)

HYDRAULIC PRESSURE REGULATORS

H. W. Aitken Co. Ltd., Paisley, Scotland
Blairs Ltd., (see page 171)
Farrel-Birmingham Company, Inc., (see page 10)
Fulton Iron Works Company, (see page 4)
Geo. L. Squier Manufacturing Co., (see page 13)

INDUSTRIAL LUBRICANTS

The Texas Company, (see page 157)

INSTRUMENTS — Controlling, Indicating and Recording

Bristol Company, Waterbury, Conn.
Brown Instrument Company, Philadelphia, Pa.
Consolidated Ashcroft-Hancock Company, Inc., Bridgeport, Conn.
Foxboro Company, Foxboro, Mass.
Duncan Stewart & Company, Ltd., (see page 168)
C. J. Tagliabue Manufacturing Co., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.

INTERMEDIATE CARRIERS

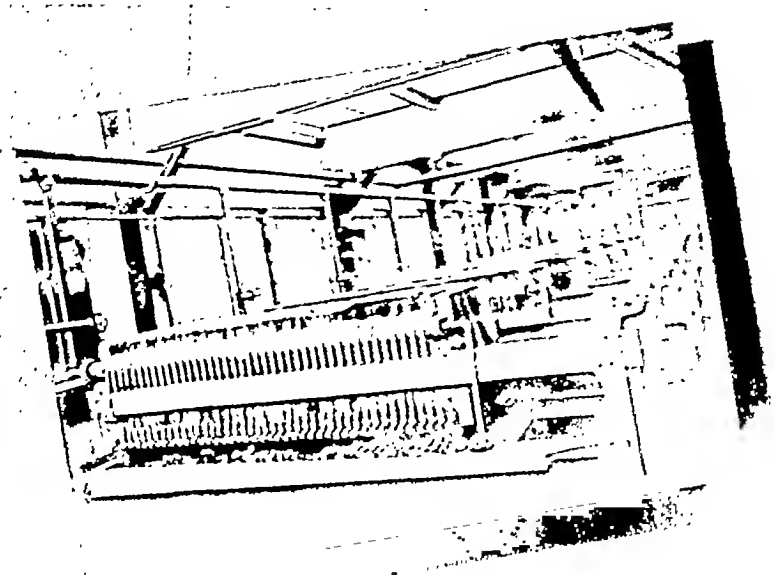
Blairs Ltd., (see page 171)
Chain Belt Company, (see page 153)
Farrel-Birmingham Company, Inc., (see page 10)
Fulton Iron Works Company, (see page 4)
Goslin-Birmingham Manufacturing Company, Inc., Birmingham, Ala.
Jeffrey Manufacturing Company, (see page 12)
Link-Belt Company, (see page 170)
Duncan Stewart & Company, Ltd., (see page 168)

JUICE STRAINERS AND TRASH ELEVATORS

Blairs Ltd., (see page 171)
Farrel-Birmingham Company, Inc., (see page 10)
Fulton Iron Works Company, (see page 4)
Kelvin Engineering Co., Inc., New York, N. Y.
Link-Belt Company, (see page 167)
Mirrlees Watson Company, Ltd., (see page 162)
W. S. Tyler Company, Cleveland, Ohio

FILTER CLOTH *for* SUGAR

Chain Cloths Ducks



Sheeting

COTTON FILTER FABRICS

We regularly manufacture over 3000 different filter fabrics ranging from heavy 12 '0 ducks to fine sheetings and drills. Our line of filter fabrics for the sugar industry offers almost unlimited choice from scientifically constructed fabrics that are suitable for efficient operation in sugar filtrations. Our engineers will gladly cooperate with sugar refiners in solving filtration fabric problems. Write our nearest office.

WELLINGTON SEARS COMPANY

65 Worth Street New York, N. Y.

Boston Philadelphia Atlanta Chicago Detroit New Orleans

KNIVES AND LEVELERS—CANE

Blairs Ltd., (see page 171)
Farrel-Birmingham Company, Inc., (see page 10)
Fawcett, Preston & Co. Ltd., Liverpool, England
Fulton Iron Works Company, (see page 4)
Kelvin Engineering Co., Inc., New York, N. Y.
Link-Belt Company, (see page 167)
Mirrlees Watson Company, Ltd., (see page 162)
A. & W. Smith & Company Ltd., (see page 164)
Geo. L. Squier Manufacturing Co., (see page 13)
Duncan Stewart & Company, Ltd., (see page 168)

LABORATORY AND TESTING EQUIPMENT

Akatos, Inc., (see page 169)
Bausch & Lomb Optical Company, Rochester, N. Y.
Carl Zeiss, Inc., (see page 182)

LOCOMOTIVES

American Locomotive Company, New York, N. Y.
Baldwin Locomotive Works, Eddystone, Pa.
Hunslet Engine Co., Ltd., Leeds, England
Koppel Industrial Car & Equipment Co., Koppel, Pa.
Lima Locomotive Works, Inc., New York, N. Y.
Vulcan Iron Works Company, Wilkes-Barre, Pa.

LUBRICATING OILS

The Texas Company, (see page 157)

MAGNETIC SEPARATORS

Farrel-Birmingham Company, Inc., (see page 10)
Fulton Iron Works Company, (see page 4)
International General Electric Company, (see page 165)

MECHANICAL RUBBER GOODS

United States Rubber Export Co., Ltd., (see page 11)

MILLS—CANE

Blairs Ltd., (see page 171)
Farrel-Birmingham Company, Inc., (see page 10)
Fawcett, Preston & Co., Ltd., Liverpool, England
Cie de Fives-Lille, (see page 155)
Geo. Fletcher & Company Ltd., Derby, England
Fulton Iron Works Company, (see page 4)
Goslin-Birmingham Manufacturing Company, Inc., Birmingham, Ala.
Hallesche Maschinenfabrik und Eisengiesserei, (see page 181)
Krupp Grusonwerk, Magdeburg, Germany
Mirrlees Watson Company, Ltd., (see page 162)
Skoda Works, Ltd., (see page 160)
A. & W. Smith & Company Ltd., (see page 164)
Geo. L. Squier Manufacturing Co., (see page 13)
Duncan Stewart & Company, Ltd., (see page 168)
U. C. M. A. S., (see page 156)
Maschinenfabrik Buckau R. Wolf A.-G., (see page 179)

NOZZLES

Taylor Forge & Pipe Works, (see page 170)

PACKAGING MACHINERY

J. L. Ferguson Company, Joliet, Ill.
Pneumatic Scale Corporation, Ltd., Quincy, Mass.

PERFORATED METALS

Harrington & King Perforating Company, Chicago, Ill.
Chas. Mundt & Sons, Jersey City, N. J.
Wickwire Spencer Steel Company, New York, N. Y.

PETREE PROCESS

Petree & Dorr Engineers, Inc., (see pages 2-3)

PIPE FITTINGS

Taylor Forge & Pipe Works, (see page 170)

PIPING—COPPER OR BRASS

American Brass Company, Waterbury, Conn.
Revere Copper and Brass, Inc., New York, N. Y.
The Yorkshire Copper Works, Ltd., (see Inside Back Cover)

PIPING — Spiral — Lap Welded — Wrought Iron — Electric-Weld

Taylor Forge & Pipe Works, (see page 170)

PUMPS

Frank L. Allen, Inc., (see page 170)
American Steam Pump Company, Battle Creek, Mich.
Baeuerle & Morris, Inc., Philadelphia, Pa.
Blairs Ltd., (see page 171)
Byron-Jackson Company, Berkeley, Calif.
De Laval Steam Turbine Company, Trenton, N. J.
Cie de Fives-Lille, (see page 155)
Fulton Iron Works Company, (see page 4)
Gardner-Denver Company, Quincy, Ill.
Guild & Garrison, Inc., Brooklyn, N. Y.
Ingersoll-Rand Company, New York, N. Y.
Mirrlees Watson Company, Ltd., (see page 162)
Oliver United Filters, Inc., (see Inside Front Cover)
Geo. L. Squier Manufacturing Co., (see page 13)
Stothert & Pitt, Ltd., (see page 166)
U. C. M. A. S., (see page 156)
Viking Pump Company, Cedar Falls, Iowa
Worthington Pump & Machinery Corporation, Harrison, N. J.

RAILWAY EQUIPMENT

American Locomotive Company, New York, N. Y.
Baldwin Locomotive Works, Eddystone, Pa.
Hyman-Michaels Company, Chicago, Ill.
Koppel Industrial Car & Equipment Company, Koppel, Pa.
Lima Locomotive Works, Inc., New York, N. Y.

REFINING PROCESSES

American Norit Company, (see page 151)
Petree & Dorr Engineers, Inc., (see pages 2-3)
Suchar Process Corporation, New York, N. Y.
Sucro-Blanc, Inc., (see page 5)

REFRACTOMETERS

Akatos, Inc., (see page 169)
Bausch & Lomb Optical Company, Rochester, N. Y.
Carl Zeiss, Inc., (see page 182)

REPAIRS—Laboratory and Testing Equipment

Akatos, Inc., (see page 169)
Bausch & Lomb Optical Company, Rochester, N. Y.
Carl Zeiss, Inc., (see page 182)

REPAIRS—Sugar Mill Equipment

Blairs Ltd., (see page 171)
Farrel-Birmingham Company, Inc., (see page 10)
Fulton Iron Works Company, (see page 4)
Goslin-Birmingham Manufacturing Company, Inc., Birmingham, Ala.
Kilby Manufacturing Company, Cleveland, Ohio
Geo. L. Squier Manufacturing Co., (see page 13)

ROLLS—Complete, including ROLL SHAFTS (Carbon and Special Alloy)—ROLL SHELLS

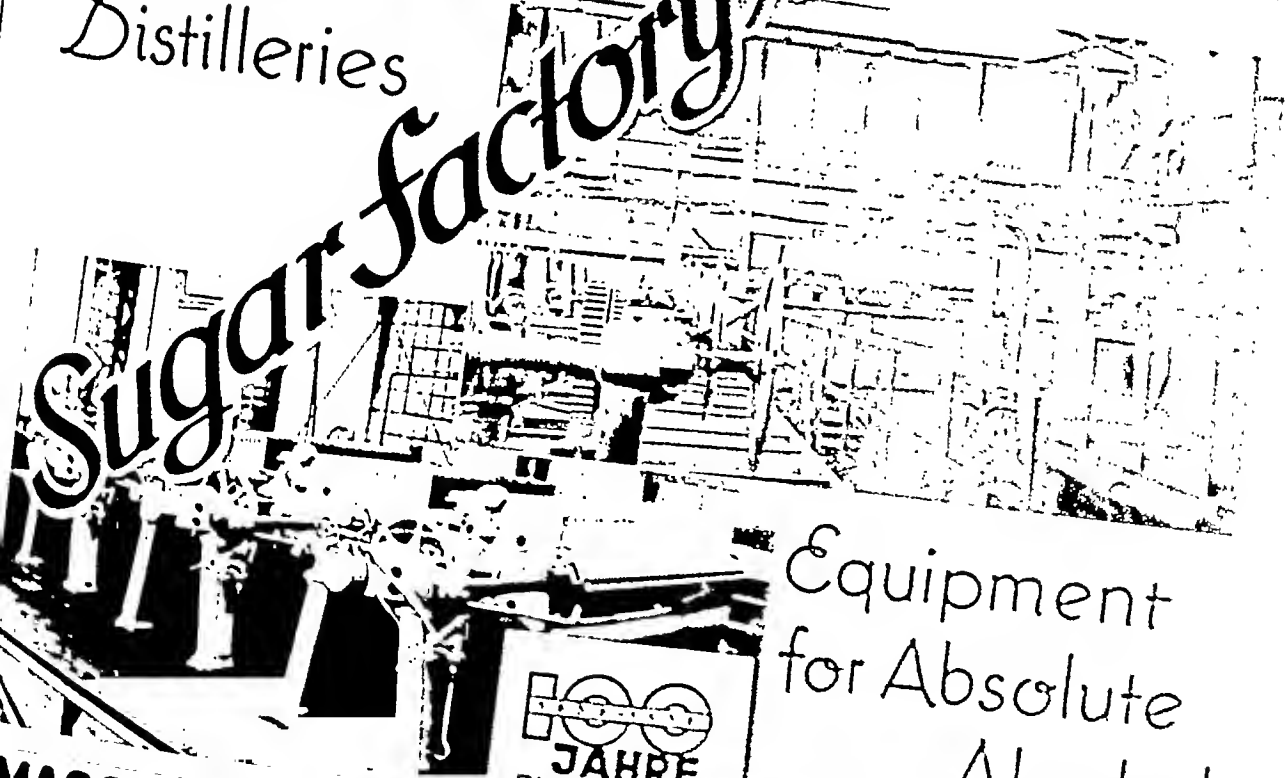
H. W. Aitken Co. Ltd., Paisley, Scotland
Blairs Ltd., (see page 171)
Farrel-Birmingham Company, Inc., (see page 10)
Fawcett, Preston & Co. Ltd., Liverpool, England
Cie de Fives-Lille, (see page 155)
Geo. Fletcher & Company Ltd., Derby, England
Fulton Iron Works Company, (see page 4)
Goslin-Birmingham Manufacturing Company, Inc., Birmingham, Ala.
Hallesche Maschinenfabrik und Eisengiesserei, (see page 181)
Krupp Grusonwerk, Magdeburg, Germany
Mirrlees Watson Company, Ltd., (see page 162)
Skoda Works, Ltd., (see page 160)
A. & W. Smith & Company Ltd., (see page 164)
Geo. L. Squier Manufacturing Co., (see page 13)
Duncan Stewart & Company, Ltd., (see page 168)
U. C. M. A. S., (see page 156)
Maschinenfabrik Buckau R. Wolf A.-G., (see page 179)

Complete Factories

Sugar Refineries

Distilleries

Sugar factory Machinery



Equipment for Absolute Alcohol

100 JAHRE BUCKAU-WOLF

MASCHINENFABRIK BUCKAU R. WOLF A.-G.
SUGAR MACHINERY DEPARTMENT
MAGDEBURG (GERMANY)

RUBBER BELTING

United States Rubber Export Co., Ltd., (see page 11)

SACCHARIMETERS

Akatos, Inc., (see page 169)
Bausch & Lomb Optical Company, Rochester, N. Y.
Carl Zeiss, Inc., (see page 182)

SCHARNBERG HYDRAULIC PACKING RINGS

Farrel-Birmingham Company, Inc., (see page 10)

SCREENS (Wire)

Frank L. Allen, Inc., (see page 170)
Wm. Riddell, Cousland & Co., Ltd., (see page 168)

SHREDDERS

Blairs Ltd., (see page 171)
Farrel-Birmingham Company, Inc., (see page 10)
Cie de Fives-Lille, (see page 155)
Geo. Fletcher & Company Ltd., Derby, England
Jeffrey Manufacturing Company, (see page 12)
Mirrlees Watson Company, Ltd., (see page 162)

SPEED INCREASING UNITS

Farrel-Birmingham Company, Inc., (see page 10)

SPEED REDUCTION UNITS

Falk Corporation, Milwaukee, Wis.
Farrel-Birmingham Company, Inc., (see page 10)
Link-Belt Company, (see page 167)

STACKERS

Jeffrey Manufacturing Company, (see page 12)
Link-Belt Company, (see page 167)

SUGAR

California & Hawaiian Sugar Refining Corp., (see page 169)
National Sugar Refining Company, (see page 150)
Savannah Sugar Refining Corporation, (see page 158)

SUGAR MACHINERY—GENERAL

Blairs Ltd., (see page 171)
Farrel-Birmingham Company, Inc., (see page 10)
Fawcett, Preston & Co. Ltd., Liverpool, England
Cie de Fives-Lille, (see page 155)
Geo. Fletcher & Company Ltd., Derby, England
Goslin-Birmingham Manufacturing Company, Inc., Birmingham, Ala.
Hallesche Maschinenfabrik und Eisenglesserei, (see page 181)
Kelvin Engineering Co., Inc., New York, N. Y.
Mirrlees Watson Company, Ltd., (see page 162)
Maschinenfabrik Sangerhausen A.-G., (see page 159)
Skoda Works, Ltd., (see page 160)
A. & W. Smith & Company Ltd., (see page 164)
Geo. L. Squier Manufacturing Co., (see page 13)
Duncan Stewart & Company, Ltd., (see page 168)
Swenson Evaporator Company, (see page 184)
U. C. M. A. S., (see page 156)
Maschinenfabrik Buckau R. Wolf A.-G., (see page 179)

TRACTORS

Allis-Chalmers Manufacturing Company, Milwaukee, Wis.
Athey Truss Wheel Company, Chicago, Ill.
J. I. Case Company, Racine, Wis.
Caterpillar Tractor Company, Peoria, Ill.
Cleveland Tractor Company, Cleveland, Ohio
Ford Motor Company, Detroit, Michigan
John Fowler & Co. (Leeds) Ltd., Leeds, England
International Harvester Company of America, Inc., Chicago, Ill.
Oliver Farm Equipment Company, Chicago, Ill.
Trackson Company, Milwaukee, Wis.

TRAMP IRON MAGNETS

Farrel-Birmingham Company, Inc., (see page 10)

TRANSMISSION MACHINERY

Chain Belt Company, (see page 153)
Farrel-Birmingham Company, Inc., (see page 10)
Jeffrey Manufacturing Company, (see page 12)
Link-Belt Company, (see page 167)
Rigler Engineering Co., (see page 168)

TUBING AND PIPING—Copper or Brass

American Brass Company, Waterbury, Conn.
Revere Copper and Brass, Inc., New York, N. Y.
The Yorkshire Copper Works Ltd., (see Inside Back Cover)

TURBINES

Allis-Chalmers Manufacturing Co., Milwaukee, Wis.
De Laval Steam Turbine Company, Trenton, N. J.
International General Electric Company, Inc., (see page 165)
Moore Steam Turbine Corporation, Wellsville, N. Y.
B. F. Sturtevant Company, Inc., Hyde Park, Boston, Mass.
Terry Steam Turbine Company, Hartford, Conn.
Westinghouse Electric International Company, New York, N. Y.
D. E. Whiton Manufacturing Company, New London, Conn.

USED EQUIPMENT

Consolidated Products Co., New York, N. Y.

VACUUM PANS

Acme Coppersmithing & Machine Company, Oreland, Pa.
H. W. Aitken Co., Ltd., Paisley, Scotland
Frank L. Allen, Inc., (see page 170)
Baeuerle & Morris, Inc., Philadelphia, Pa.
Blairs Ltd., (see page 171)
Fawcett, Preston & Co., Ltd., Liverpool, England
Cie de Fives-Lille, (see page 155)
Geo. Fletcher & Company Ltd., Derby, England
Fulton Iron Works Company, (see page 4)
Goslin-Birmingham Manufacturing Company, Inc., Birmingham, Ala.
Kelvin Engineering Co., Inc., New York, N. Y.
Kilby Manufacturing Company, Cleveland, Ohio
Mirrlees Watson Company, Ltd., (see page 162)
Joseph Oat & Sons, Philadelphia, Pa.
Philadelphia Coppersmithing Company, Philadelphia, Pa.
Maschinenfabrik Sangerhausen A.-G., (see page 159)
Skoda Works, Ltd., (see page 160)
A. & W. Smith & Company Ltd., (see page 164)
Geo. L. Squier Manufacturing Co., (see page 13)
Duncan Stewart & Company, Ltd., (see page 168)
Swenson Evaporator Company, (see page 184)
John Thompson Water Tube Boilers, Ltd., Wolverhampton, England.
U. C. M. A. S., (see page 156)
United States Pipe & Foundry Company, Burlington, N. J.

VALVES

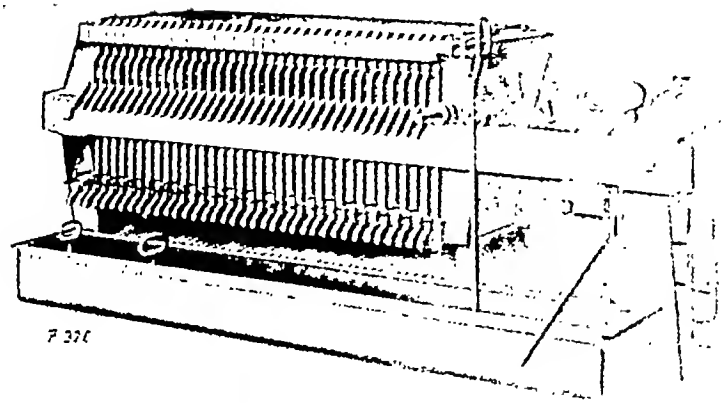
Consolidated Ashcroft-Hancock Company, Inc., Bridgeport, Conn.
Crane Company, Chicago, Ill.
Jenkins Bros., Bridgeport, Conn.
Lunkenheimer Company, Cincinnati, Ohio
Walworth Company, New York, N. Y.
Yarnall-Waring Company, Philadelphia, Pa.

WeldELLS

Taylor Forge & Pipe Works, (see page 170)

FILTERPRESSES

of all sizes



Presses 24 x 24" with hand closing device

32 x 32" with hand closing by gearing

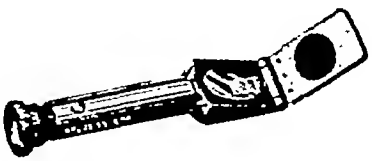
40 x 40" with hand closing by gearing or with hydraulic device

HME
HALLE

HALLESCHE MASCHINENFABRIK UND EISENGIESSEREI-HALLE
GERMANY

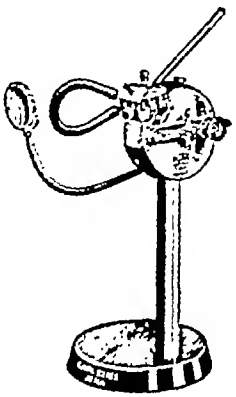
ZEISS

REFRACTOMETERS
For The Sugar Industry



HAND SUGAR REFRACTOMETER

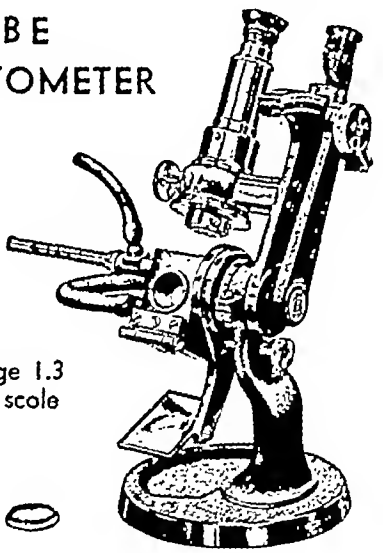
For field use to ascertain the most favorable point of maturity of sugar cane or beet.



SUGAR & OIL REFRACTOMETER

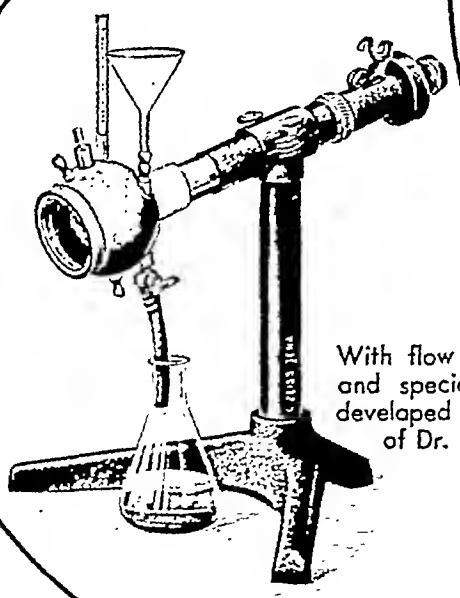
Refractive index scale from 1.33 to 1.54; and dry substance scale from 0 to 95%.

ABBE REFRACTOMETER



Refractive index range 1.3 to 1.7; dry substance scale 0 to 95%.

DIPPING REFRACTOMETER



With flow through cell and special sugar prism; developed at the suggestion of Dr. F. R. Bachler.

Other Equipment for the sugar laboratory:

THE PULFRICH PHOTOMETER

and

A MICRO-PROJECTION APPARATUS for controlling the condition of sugar grain in the boiling pan

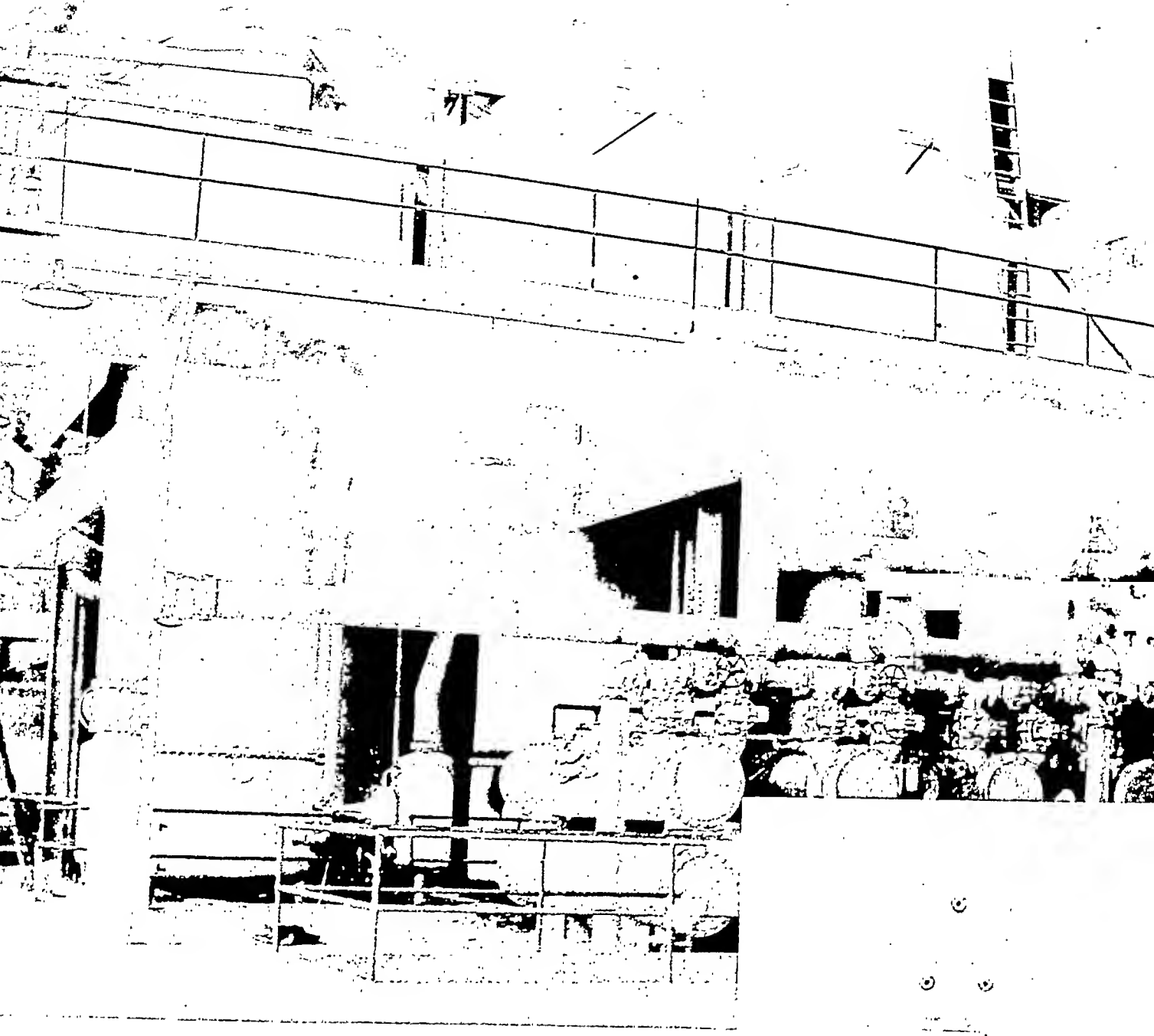
Etc.

CARL ZEISS, INC.

485 Fifth Avenue
NEW YORK

728 So. Hill Street
LOS ANGELES

CARL ZEISS JENA



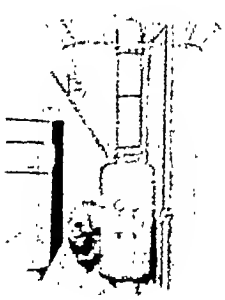
Beet sugar manufacturers can be certain of lowest operating cost with an up-to-date evaporator as shown above, because of these advantages:

Large capacity in a single unit.
High velocity with low temperature differences.
Higher operating pressures permit use of more process vapors for pans and heaters.
Very little juice held in body—low entrainment.
More thorough stripping of ammonia vapors.
Better venting and condensate removal.
One-pass evaporation—ease of operation—higher purity.

Additional plant economies can be obtained thru using Swenson rotary vacuum filters, strike pans, crystallizers and juice heaters. Years of experience are back of all Swenson recommendations.

Send for Special Beet Sugar Bulletin

SWENSON EVAPORATOR COMPANY
(Division of Whiting Corporation)
15602 Lathrop Ave., Harvey, Ill.



This photograph shows the Swenson long-tube pre-evaporator applied to an existing quad of older design, making a quintuple-effect unit. Several installations of this kind have been made and all show marked steam economies and increased capacity. Existing plants can benefit immediately by adding this newest design of pre-evaporator to present equipment.

SWENSON

"Yorkshire"

SUGAR TUBES

WILL NOT "SEASON CRACK" OR DEZINCIFY

DEZINCIFICATION

"SEVA" BRASS

"YORKSHIRE" COPPER

"YORCALNIC"

70\30 CUPRO NICKEL

OUR RESEARCH DEPARTMENT IS AT THE DISPOSAL OF ALL SUGAR FACTORIES. WE EXAMINE SAMPLES OF FAILED TUBES FREE AND ADVISE WITHOUT CHARGE OF DELIVERY ON THE STEPS TO BE TAKEN TO AVOID FAILURE.

Sole Makers

THE YORKSHIRE COPPER WORKS LTD

TELEPHONE 71201 LEEDS ENGLAND TELEGRAMS "YORKSHIRE" LEEDS

SECTION WORKS AVAILABLE IN ANY SIZE